BUREAU OF HYGIENE AND TROPICAL DISEASES

TROPICAL DISEASES BULLETIN

Vol. 57 1960 No. 2

SUMMARY OF RECENT ABSTRACTS*

II. YELLOW FEVER†

Epidemiology: Aetiology

For those who wish to acquaint themselves with the history of yellow fever research since the turn of the century, BOYD (p. 605) has written a short but informative account which does justice to the Walter Reed Commission, The Rockefeller Yellow Fever Commission in West Africa, and to the workers who elaborated the 17D vaccine now widely used. SOPER (p. 294) sums up the status of yellow fever in the Americas in 1957. Few cases were known to occur in that year, but the risk of urban epidemics related to rural infection, though reduced, is by no means eliminated, and the case is recorded of a person infected in the jungle who then travelled a long distance by air before the disease was diagnosed. The risk of international travel remains.

WOLFF *et al.* (p. 525) give details of 576 protection tests on sera from Negroes, Indians and Creoles in Surinam, where the proportions of males found positive at ages under 40 ranged from 25 to 52·3%, and at ages over 40 from 54·5 to 81·7%. Females showed lower rates. All tests with 35 animal sera were negative. Yellow fever is constantly reported from the Amazon valley of Brazil, and CAUSEY and MAROJA (p. 1228) describe 2 small epidemics in which the virus was isolated from patients and (in one outbreak) from pools of *Haemagogus*, Sabethines and *Aëdes*. The outbreaks occurred in forest workers.

In a survey of sera in western Nigeria MACNAMARA *et al.* (p. 819) found antibodies to Bwamba, Zika, Uganda S, dengue and yellow fever viruses in up to more than half of adolescents. There was a significant association between Zika and some of the others, including yellow fever, though after one outbreak of yellow fever the incidence of Zika antibodies did not rise. The high incidence of these various group B antibodies may explain the

* The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin*, 1959, v. 56. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

† For previous articles on yellow fever in this series, see the February issues of the *Tropical Diseases Bulletin* each year since 1939.

absence of epidemic yellow fever, rather by modification of the disease than by prevention of infection.

THEILER and CASALS (p. 606) record anomalies in the serial serological response of patients to yellow fever, the infection being proved by isolation of the virus. In one type of response the complement-fixation test became positive only to yellow fever, and the haemagglutinin-inhibition test, though less specific, was still positive at high titre for yellow fever. In another type of response these two tests and the neutralization test often became positive to other arborviruses (Ilhéus, dengue 1 and 2, St. Louis) as well, and the heterologous responses were often higher than the homologous. Persons with this type of response had probably been infected previously with at least 1 virus of the B group. Serological diagnosis of secondary infections is obviously difficult. In part of Colombia yellow fever is reported from time to time, and repeated large-scale vaccination campaigns have failed to stop sporadic cases; GROOT *et al.* (p. 1020) examined a large number of sera for antibodies to various arborviruses. The age-distribution of yellow fever antibodies suggested that they were the result of vaccination. The distribution of the other antibodies (to dengue, Ilhéus, St. Louis, Venezuelan equine encephalomyelitis, Mayaro and Bunyamwera) is given.

In experiments on mice inoculated intracerebrally with various strains of yellow fever virus COLLIER *et al.* (p. 605) observed that the amount of virus recoverable at intervals up to 24 hours was less than expected, and they attribute this to the eclipse phenomenon, which apparently requires live cells with active metabolism since it does not occur when virus is placed in contact with a suspension of normal mouse brain.

The same authors (p. 1229) describe a mouse intracerebral protection test in which dilutions of 17D and of serum were inoculated. The LD50 was calculated every day from the number of dead mice and the degree of immunity was calculated by elaboration of virulence curves which were compared with controls. This method is claimed to have distinct advantages over the usual calculation of LD50 at the end of the test and the immunity index calculated from it. Details must be sought in the original.

BOIRON and CAMAIN (p. 31) inoculated various doses of a neurotropic strain of yellow fever virus by the subcutaneous or intraperitoneal route into guinea-pigs. In very small doses there was no evidence of infection or of the production of antibodies, but with larger doses the virus could be recovered from the blood and various organs, persisting for several days and provoking the formation of antibodies, though the infections were "inapparent". The guineapig, therefore, is sensitive to parenteral injection of neurotropic yellow fever virus.

Transmission

In a study of mosquitoes in a forest region of the Belgian Congo LAARMAN (p. 572) observed that *Aëdes apicoargenteus* showed a marked preference for the highest tree levels, up to 25 metres, but *Aëdes africanus* and the *chrysogaster* group of *Eretmapodites* lived lower down. *Aëdes apicoargenteus* preferred clearings, but *Aëdes africanus* preferred dense forest. In one area *Aëdes simpsoni* preferred man to monkey, but in another it did not bite man. Other species of *Aëdes* were also studied.

FRANCO (p. 432) reports that no foci of *Aëdes aegypti* had been found in

Brazil since 1955. Periodic epizootics of yellow fever occur, and therefore vaccination, and also the viscerotomy service, should be continued.

GALINDO (p. 148) describes the bionomics of *Sabethes chloropterus*, a known vector, which bites during the afternoon and will breed in prepared bamboo pots containing water. The mean life span of females after the first blood meal, when maintained at 26·1°–26·8°C. and 92–97% RH, was 38·9 days with a maximum of 140 days. DE RODANICHE *et al.* (p. 1122) show experimentally that *Sabethes chloropterus* can transmit yellow fever by bite, but is a relatively inefficient vector with an extrinsic incubation period of 34–37 days, and requires a high titre of circulating virus in the infected animal before it can become infected itself.

Yellow fever is still present in the interior of Surinam, especially in the Bush Negroes who are woodcutters, and in the Amerindians of the savannah region. VAN DER KUYP (p. 147) states that *Haemagogus equinus* and *H. spegazzinii falco* have been found, and that *Aëdes aegypti* is still present along the coast where most of the people live, and that it is now resistant to DDT.

Haemagogus equinus has been found in Texas, and HAYES and TINKER (p. 431) comment on the risk of spread of yellow fever from Central America to areas of the United States where *Aëdes aegypti* still exists. A search of the Dallas (Texas) area by LAAKE (p. 432) failed to find *H. equinus* there, but *Aëdes aegypti* breeds throughout the year and could transmit yellow fever if this was introduced.

HUGHES and PORTER (p. 606) show that anti-*Aëdes* measures have been intensified in the southern United States in view of the threat of yellow fever from Central America. Surveys have shown *Aëdes aegypti* breeding in areas of possible importance.

Many South American countries have now been declared free from *Aëdes aegypti*, and PINTO SEVERO (p. 527) gives an account of the development of the eradication campaign.

Immunization

In Holland DE ROEVER-BONNET and HOEKSTRA (p. 148) vaccinated a group of people with 17D suspended in gum arabic in distilled water, by the scarification method after cleansing the skin with ether. Positive results were obtained in 93% and inconclusive in 3%. In comment Stuart recalls the finding of CANNON and DEWHURST [this *Bulletin*, 1954, v. 51, 567] that the use of ether reduces the number of positive results, and the opinion of KOUWENAAR [*ibid.*, 1953, v. 50, 928] that reactions to 17D will only be overcome when scarification is substituted for injection.

If, because of allergy to chick embryo tissue, 17D cannot be given subcutaneously and the intradermal route is preferred, the practice at the Pasteur Institute in Paris has been to give 0·1 ml. intradermally and to follow this 1–2 months later by scarification with the Dakar vaccine. PANTHIER *et al.* (p. 713) examined the sera of persons given the intradermal dose and they conclude that the antibody response was about one-half of the response to the subcutaneous vaccination and about one-tenth of the response to the Dakar vaccine given by scarification.

COLLIER *et al.* (p. 714) report that intraperitoneal 17D protects mice against intracerebral challenge with 17D but not against intracerebral neurotropic

Asibi, whereas intraperitoneal Asibi protects against both. Mice surviving from titrations of 17D intracerebrally showed protection against intracerebral challenge by both viruses, but mice which had received the first intracerebral dose of Asibi usually died.

COLLIER *et al.* (p. 1228) claim that on one occasion the virulence of 17D was changed after a single passage intracerebrally in mice, at various dilutions. They (p. 1229) passaged 17D intracerebrally in mice and observed an increase in virulence. Cross-challenge experiments suggest that there may be antigenic differences between 17D, mouse-adapted 17D, and mouse-adapted Asibi, though they all have a common origin in viscerotropic Asibi virus. In comment Gordon Smith suggests that proof of antigenic changes in arborviruses due to changes of host would have important implications.

In Nigeria MEERS (p. 820) vaccinated a group of Africans with combined smallpox and mouse-brain 17D vaccine (dried and reconstituted) by scarification. The smallpox result was apparently satisfactory but only two-thirds of the subjects became protected against yellow fever; there was no evidence of interference or of synergy between the viruses. This is considerably lower than the 85 ± 5% of conversion rates recorded elsewhere after subcutaneous 17D alone. He therefore does not recommend this combined vaccine. He (p. 1021) had previously observed that when smallpox vaccine (which contained 1·25% peptone as a protective agent) was mixed with a 17D yellow fever mouse-brain scarification vaccine and freeze-dried, the peptone exerted a protective effect on the 17D vaccine. He now reports that this concentration of peptone gives better protection than concentrations above or below this figure.

Charles Wilcocks

MALARIA

In this section abstracts are arranged as far as possible in the following order:—Human malaria—*epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control;* Animal malaria—*monkeys, other animals, birds.*

METSELAAR, D. & VAN THIEL, P. H. **Classification of Malaria.** *Trop. & Geograph. Med.* Amsterdam. 1959, June, v. 11, No. 2, 157–61. [16 refs.]

The authors have found that in some parts of New Guinea the spleen rate in adults living in holoendemic conditions (*i.e.*, 150 or more infected bites annually well distributed through the year) is as high as 78%. Nevertheless, these people exhibit a high tolerance of malaria. Possible causes of the low spleen rates in holoendemic areas in Africa and India are a high protein diet or the sickle-cell trait, or perhaps other causes not yet known. VISWANATHAN [this *Bulletin*, 1952, v. 49, 1022] observed in parts of India a high adult spleen rate associated with a high inoculation rate and transmission for 9 months or more annually.

The authors feel that the present classifications of malaria based on mosquito characteristics or on spleen rates are unsatisfactory and that a method of classification, based on one or two simple surveys of population groups, is needed. They suggest that this should reflect the malaria risk and therefore the parasite rate should be considered first. They propose the following classification: *Hypoendemic*—if the absolute parasite rate in the age-group 2–10 years is under 10% for most of the year; *Mesoendemic*—parasite rate between 11% and 50% for most of the year; *Hyperendemic*—parasite rate constantly over 50%; *Holoendemic*—parasite rate constantly over 75% in the one-year age-group; the adult spleen rate may be high (New Guinea type) or low (African type); the parasite density declines rapidly between second and fifth year of life and then more slowly. *T. H. Davey*

RADACOVICI, Ecaterina *et al.* Studiul evoluţiei endemiei palustre în zona bazinului hidrografic al rîului Arges si a afluenţilor săi. [**A Study on the Course of Endemic Malaria in the Hydrographic Basin of the Arges River and its Tributaries**] *Microbiol., Parazitol., Epidemiol.* Bucharest. 1959, Mar.–Apr., v. 4, No. 2, 149–62, 2 maps (1 folding on pl.).

MARIANI, M. Alcuni elementi per lo studio della zoogeografia della Sicilia. [**Some Zoogeographical Studies in Sicily**] Reprinted from *Boll. di Zoologia.* 1957, v. 24, 685–98, 5 figs. [26 refs.] English summary (6 lines).

In a short review in which the fauna of Sicily is compared with that on the Italian mainland, members of the *Anopheles maculipennis* complex receive especial mention.

Three separate species are recognized within the subgenus *Maculipennia*: *A. maculipennis*, *A. labranchiae* and *A. sacharovi*. Of the three, *A. labranchiae* alone is to be found in Sicily.

The distribution of the species in Sicily and Southern Italy is examined in the light of its evolutionary history. Probable paths of migration are traced in relation to past geological events and the effect of biological isolation in Sicily is examined. It is postulated that before the isolation of Sicily from the Italian mainland *A. labranchiae*, in migrating north, gave rise to the race *atroparvus*. While *A. labranchiae* in Sicily is normally autosomally uniform, cytogenetic examination of *atroparvus* from Italy shows that, together with the typical arrangement indistinguishable from that of *A. labranchiae*, there also exists in some members of this race an inversion of a broad zone of the left arm of the 3rd chromosome. In consequence there are 3 different arrangements: standard, inverted homozygote and heterozygote.

Unlike other species, which assume "nordic forms" in the mountainous regions of Sicily, *A. labranchiae* is morphologically and ecologically uniform in all its vast Sicilian range. Five other anophelines inhabit this island, but *A. labranchiae* is numerically predominant. It occurs up to 3,000 feet on mountain sides where it is replaced by *A. marteri*.

It is concluded that in spite of the extreme variety of habit of *A. labranchiae* found in Sicily, it has retained much in common with populations inhabiting north Africa. *R. J. Wood*

COLLIGNON, E. Observations biologiques sur les anophèles de la Région d'Alger (1932–1956). [**Biological Observations on Anophelines in the Algiers Region in 1932–1956**] *Arch. Inst. Pasteur d'Algérie.* 1959, June, v. 37, No. 2, 263–85, 12 figs. on 6 pls. & 2 text figs. [38 refs.]

This paper describes in detail the breeding places of *Anopheles maculipennis labranchiae*, *A. hispaniola*, *A. marteri*, *A. claviger* and *A. algeriensis*, with notes on the vegetation and animals associated with the breeding places. There are 2 maps to show the distribution of all except *A. maculipennis labranchiae* in Algeria, and 12 photographs illustrate the breeding places.

There are also detailed notes on the resting places of adult *A. maculipennis labranchiae* in Algeria which are best consulted in the original paper.

B. R. Laurence

LIPS, M. Anopheles du Congo Belge—1. Espèces particulières du Katanga. Références—récoltes—répartition et importance médicale actuelle. [**Anophelines of the Belgian Congo. Species found in Katanga**] *Riv. di Parassit.* Rome. 1959, Sept., v. 20, No. 3, 165–89, 1 map. [74 refs.]

The English summary appended to the paper is as follows:—

"An ecological distribution list and map of Anopheles, particularly of the Katanga Province (Belgian Congo), with an historical account of the collectings and bibliography in chronological order and alphabetical order of the authors, are given for *Anopheles ardensis*, *argenteolobatus*, *austeni*, *berghei*, *caliginosus*, *leesoni*, *michaeli*, *moushinoi*, *rivulorum*, *rodhaini*, *schwetzi*, *ugandae*, *walravensi* and *wellcomei*.

"At the present time, these Anopheles cannot be incriminated as Malaria vectors in this country. This assertion is based on five criteria.

"An alphabetical list of the 58 Anopheles of the Belgian Congo, is added."

LAARMAN, J. J. **A New Species of *Anopheles* from a Rain-Forest in Eastern Belgian Congo.** *Trop. & Geograph. Med.* Amsterdam. 1959, June, v. 11, No. 2, 147–56, 4 pls. & 9 figs. [15 refs.]

The discovery of a species of *Plasmodium* in the blood of porcupines (*Atherurus africanus*) [this *Bulletin*, 1959, v. 56, 696, 697] led to the discovery of a new species of *Anopheles*, *A.* (*Neomyzomyia*) *vanthieli*, related to *A. smithi* var. *rageaui*, in the Belgian Congo. [The author describes his new species as *A. van Thieli*.] Previous mosquito collections from bait and natural shelters did not reveal the presence of the new species in the region of Irangi, but *A. vanthieli* has proved to be not uncommon, resting just outside, or inside, the entrances to "caves" in the forest floor inhabited by porcupines. Trapping, in which porcupine, monkey and rabbit were used as bait, showed that this species is strongly attracted by porcupines. The larvae were found in small streams in dark forest near the adult haunts.

Sporozoite infections of this species were found to be localized but, where they were found, the infection rate was high (24%) [*loc. cit.*], which agrees with the low dispersal activity and sedentary habits of this species.

The author suggests that *A. vanthieli* is a strictly endophilous species and that

the term "endophilous" cannot be restricted to house-haunting mosquitoes alone. *B. R. Laurence*

LACAN, A. Les anophèles de l'Afrique equatoriale française et leur répartition. [**Anophelines of French Equatorial Africa and their Distribution**] *Ann. Parasit. Humaine et Comparée.* 1958, v. 33, Nos. 1/2, 150–70, 1 map. [18 refs.]

This is a concise report of 39 species of *Anopheles* of French Equatorial Africa with reference to their occurrence in the Middle Congo, Gabon, Oubangui-Chari and Chad territories. Biological notes and local distribution are given under species; general distribution in relation to climatic zones is discussed, supported by a map and a table. *D. S. Bertram*

AFRIDI, M. K., TALIBI, S. A., RASHID, S. A. & HUSAIN, M. Z. Y. **Identification of Races of *A. stephensi* prevalent in the Federal Karachi Area by Measurement of their Ova.** *Pakistan J. of Health.* 1958, July, v. 8, No. 2, 71–6, 3 figs.

"Measurements were taken of 14720 ova obtained from 736 females of *A. stephensi* captured in Karachi and surrounding villages. From the measurements of these ova it appears that the prevalent race in Karachi is *mysorensis*."

FRAGA DE AZEVEDO, J., GÂNDARA, A. F. & FERREIRA, A. P. Subsídios para o conhecimento dos mosquitos da tribo Anophelini (Diptera) na Província de Timor. [**Observations on Anophelines in Portuguese Timor**] *Anais Inst. Med. Trop.* Lisbon. 1958, Mar., v. 15, No. 1, 53–70, 15 figs. (14 on 7 pls.) English summary.

The English summary appended to the paper is as follows:—

"A survey of anopheline mosquitoes was made by the writers during December 1955 and January, February and March 1956, in Portuguese Timor.

"They found the following species:

Anopheles (*Anopheles*) *barbirostris barbirostris* Van der Wulp, 1884.
Anopheles (*Myzomyia*) *aconitus* Donitz, 1902.
Anopheles (*Myzomyia*) *annularis* Van der Wulp, 1884.
Anopheles (*Myzomyia*) *maculatus maculatus* Theobald, 1901.
Anopheles (*Myzomyia*) *minimus* Theobald, 1901.
Anopheles (*Myzomyia*) *subpictus subpictus* Grassi, 1899.
Anopheles (*Myzomyia*) *sundaicus* Rodenwaldt, 1926.
Anopheles (*Myzomyia*) *teselatus* Theobald, 1901.
Anopheles (*Myzomyia*) *vagus vagus* Donitz, 1902.

"Four hundred and thirty five dissections were made by the writers on the salivary glands and stomachs of females, and they have found an oocystic index, for the both species *A. barbirostris* and *A. sundaicus*, of 4%.

"A list of other species which are likely to be found later in Portuguese Timor, in view of those existing in neighbouring territories, is also shown by the writers."

ZALUTSKAYA, L. I. [**Comparative Data on the Biology of** *Anopheles minimus* **and** *A. vagus* **at Tay-Nguen (Democratic Republic of Vietnam)**] *Med. Parasit. & Parasitic Dis.* Moscow. 1959, v. 28, No. 5, 548–53, 2 charts. [In Russian.]

The English summary appended to the paper is as follows:—

"13 species of Anopheles were found in the province of Tay-Nguen during the period lasting from the I 1956 till the III of 1957. Of the total number of mosquitoes caught in the living quarters (9930)—77% belonged to A. vagus, 3% to A. minimus, while the remaining 11 species comprised 20% of the global figure. In the course of the torrid and humid period (April–September) most numerous were A. vagus, while A. minimus, absent during that time, could be encountered in the dry and cool season of the year (November–March). A. vagus bred both in the temporary and permanent water basins, filled with turbid water. On the other hand, A. minimus larvae were met with only in clear flowing waters of springs, creeks, channels and in wells.

"In the case of A. minimus the minimal duration of blood digestion comprised 48 hours, at the temperature of 24–28°C, the maximal being 120 hours, at the temperature level of 16–17°C.

"The age composition of both species was studied using the Polovodova's method and the % of females of a potentially dangerous age was stated. Potentially dangerous females of A. minimus were present during March–April and October–December 1956 and in January and March of 1957. The bulk of A. vagus females of epidemiologically potential danger made their appearance in May–October. Both species were encountered, principally, within living quarters, where they largely fed on the human blood.

"The abundance of A. vagus during the time-interval comprising April–November, their constant presence in living premises, clearly pronounced disposition towards sucking of human blood and the ability of the females to survive until after reaching the age of being epidemiologically potential dangers—all this makes it impossible to deny the epidemiological importance of this species."

MILWARD DE ANDRADE, R. Cloro dos cloretos e pH em biótopos de anofelinos, pesquisados no Distrito Federal, Brasil: I. *Anopheles tarsimaculatus* e *Anopheles argyritarsis* (Diptera, Culicidae) [**Chloride and pH Values in Anopheline Biotopes in the Federal District, Brazil. I.** *Anopheles tarsimaculatus* **and** *A. argyritarsis*] *Rev. Brasileiro Malariologia.* Rio de Janeiro. 1958, Jan., v. 10, No. 1, 17–30, 4 graphs. [11 refs.] English summary. II. *Anopheles albitarsis* e *Anopheles noroestensis* (Diptera, Culicidae) [**II.** *A. albitarsis* **and** *A. noroestensis*] *Ibid.*, Apr., No. 2, 117–25. English summary.

HURLY, M. G. D. **Administration of Pyrimethamine with Folic and Folinic Acids in Human Malaria.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1959, Sept., v. 53, No. 5, 410–11.

Pyrimethamine is now widely used in the treatment of toxoplasmic chorioretinitis, the dosage used being about 25 mgm. or more daily. Since this drug appears to inhibit the conversion of folic to folinic acid and since macrocytic

anaemia has been produced in man after a daily dose of 25 mgm. over a period of 49 days [this *Bulletin*, 1954, v. 51, 11], it would seem logical to administer folic acid along with pyrimethamine to obviate this side effect. It has been shown however that folic and folinic acids may effect partial inhibition of the antimalarial effects of diaminopyrimidines [*ibid.*, 1949, v. 46, 1124; 1950, v. 47, 1186]. There was thus a possibility that simultaneous administration of the two drugs might reduce the effectiveness of pyrimethamine in both toxoplasmosis and malaria.

The object of the investigation described in the paper under review was to observe the antimalarial effect of pyrimethamine when given simultaneously with folic acid.

9 African infants and children with heavy *Plasmodium falciparum* infections were treated with a single dose of 0·25 mgm./kgm. body weight of pyrimethamine given in a solution of 5% lactic acid. Folic or folinic acid was given as crushed tablets with water in daily doses varying from 10 to 30 mgm. for 3 days. The results were slightly better than in another series conducted previously in which pyrimethamine only was used in the same dosage [*ibid.*, 1952, v. 49, 663].

Folic and folinic acid did not in this experiment inhibit the antimalarial effect of pyrimethamine; and since there is so far no evidence that the two drugs are mutually inhibitory in toxoplasmosis, it is suggested that folic acid be given along with pyrimethamine in the treatment of this disease in order to reduce the risk of macrocytic anaemia. *G. Covell*

HURLY, M. G. D. **Potentiation of Pyrimethamine by Sulphadiazine in Human Malaria.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1959, Sept., v. 53, No. 5, 412–13.

The subjects of this trial were 55 African children living in a village in the Kombo St. Mary division of the Gambia. The object was to discover whether potentiation of pyrimethamine by sulphadiazine, as described in *Plasmodium* infection in chicks [this *Bulletin*, 1955, v. 52, 958] and in toxoplasmosis in mice [*ibid.*, 1953, v. 50, 980] and in man, could be reproduced in human malaria.

One of the children had a mixed infection of *P. ovale* and *P. falciparum*, while the remainder were infected with *P. falciparum* or *P. malariae* or with a mixture of the two. They were divided into 5 groups: group 1 received 0·1 mgm./kgm. of pyrimethamine; group 2, 0·5 gm. of sulphadiazine; group 3, 1·0 gm. of sulphadiazine; group 4, 0·1 mgm./kgm. of pyrimethamine plus 0·5 gm. of sulphadiazine; group 5, 0·01 mgm./kgm. of pyrimethamine plus 0·25 gm. of sulphadiazine.

After 72 hours parasites were still present in 31 of the 34 children in the first 3 groups, but no parasites were detected in the blood of the 21 children in groups 4 and 5.

The minimum effective dose [MED] of pyrimethamine in Gambian indigenes is said to be between 0·1 mgm./kgm. and 0·25 mgm./kgm. [see HURLY, above]. The MED of sulphadiazine was not determined, but is known to be higher than the largest dose given (1·0 gm.).

It is concluded that less than 1/10 MED of pyrimethamine and 1/4 MED

of sulphadiazine given together are as effective against the parasites of *P. falciparum*, *P. malariae* and *P. ovale* as the MED of either drug given alone.

G. Covell

ISRAEL: MINISTRY OF HEALTH. **Antimalarial Division. A Review of the State's Ten Years 1948–1957** [SALITERNIK, Z., Director]. 47 mimeographed pp., 2 folding maps & 2 diagrams. 1958.

In 1920 the spleen rate was 50–100% in most areas of Palestine, and not less than 10% anywhere in the country. By 1946 spleen rates were 0·5% or less in towns, and little more than 1% in rural settlements, except Haifa district (including Galilee) where the rate was 4·7%. Events in 1948 reduced anti-malaria work to chaos until the Antimalaria Division was formed.

The problem of malaria control in Israel is complicated by long land frontiers, continual immigration and specifically entomological features. There are 4 vector anopheles species, *Anopheles sacharovi*, *A. superpictus*, *A. claviger* and *A. sergenti*. Each has its own season, so that transmission extends over 9 months of the year, or longer if the winter is warm. All, especially *A. sergenti*, are partly exophilic and therefore not fully amenable to control by residual insecticides. *A. sergenti* is widespread, and the development of water resources constantly adds to potential breeding places.

House spraying with DDT has been extended throughout the country. A 5% kerosene solution is used (to avoid staining furniture, etc.), and the locality pays for the cost of labour and kerosene. The time schedule of spraying operations, according to the local vector, is *A. sacharovi*, April–May and October; *A. superpictus*, June and September; *A. sergenti*, April and September; all three species, April, June and September. Resistance has not yet been encountered in anophelines, but lindane and parathion in addition have been used against resistant culicines and bed bugs. Antilarval measures are also used, on account of the vectors' exophilic tendencies. The annual number of new malaria cases dropped from 1,172 in 1948 to 44 (0·02 per mille) in 1957; in the latter year also there were 25 relapsed cases. Over 60% of cases are due to *Plasmodium vivax*. *P. falciparum* occurs especially in the Jordan Valley and the Negev. *P. malariae* infection is rare. The issue of prophylatic drugs, necessary in 1948, has now been discontinued.

Transmission of malaria by blood transfusion has occurred, but is now prevented mainly by storage of whole blood in a refrigerator for a week before use.

Other anopheles species found now or formerly in Palestine include: *A. pharoensis*, *A. turkhudi*, *A. coustani*, *A. pulcherrimus*, *A. dthali*, *A. marteri*, *A. multicolor*, *A. hyrcanus* and *A. algeriensis*.

The Division is responsible also for the control of culicine breeding, arborviruses and schistosomiasis. *Culex pipiens molestus* and *C. univittatus* are of importance as nuisances and vectors of West Nile virus, and the former has been found infected with filariasis. Increasing pollution of streams with sewage provides ideal breeding conditions for them, and every possible method of breeding control has to be employed against them. The spraying of cess-pools with 0·6% dieldrin has been the most effective chemical method.

Schistosomiasis control is another responsibility of the Division. *Schistosoma mansoni* infection, though constantly imported with immigrants from

Yemen, Iraq, Egypt, Morocco etc., is confined to one area near the Yarkon river, the only breeding place of the vector *Biomphalaria alexandrina*. On the other hand, discharge into rivers of factory waste and sewage is unfavourable to *Bulinus truncatus*, which explains why the Yarkon river, previously the most important source of schistosomiasis in Israel, no longer breeds the snail. Breeding around the borders of Lake Tiberias has been controlled by lowering the water level slightly and dusting the exposed mud with copper sulphate. In laboratory conditions, 30% of local *Bulinus* snails took up infection with an Egyptian strain of *S. haematobium*, 4% took up an Iraqi strain, but none took up Moroccan and Yemeni strains. *B. B. Waddy*

See also p. 197, HERNÁNDEZ-CORZO *et al.*, **A Method for Bioassay of the Effectiveness of Residual Spraying.**

DARVAS, A. & ŠERSTNEV, E. Smanjena osetljivost *Anopheles maculipennis* na DDT u nekim krajevima BiH; osetljivost anofela na Dieldrin i Lindane. [**The Reduced Sensitivity of *Anopheles maculipennis* to DDT in some Regions of Bosnia and Herzegovina. The Sensitivity of *Anopheles* to Dieldrin and Lindane**] *Higijena*. Belgrade. 1959, v. 11, No. 1, 17–22, 2 graphs. French summary.

An investigation has been made of the sensitivity to DDT of *Anopheles maculipennis* caught in two localities in Bosnia and Herzegovina, in one of which residual spraying with DDT had been carried out for 10 years. The LD50 for insects caught in the sprayed locality was 0·098 gm. per sq. m., compared with 0·041 for insects which had not had previous environmental contact with the insecticide, and the resistance was thus increased 2·4-fold. There was no essential difference in sensitivity to dieldrin and lindane between the insects caught within the 2 localities. *D. J. Bauer*

DE ZULUETA, J. **Insecticide Resistance in *Anopheles sacharovi*.** *Bull. World Health Organization*. Geneva. 1959, v. 20, No. 5, 797–822, 1 fig. [26 refs.]

"A series of observations is presented on the susceptibility or resistance to insecticides of *Anopheles sacharovi* in Greece, Iran, Italy, Romania and Turkey. High physiological resistance to DDT was observed in the Tarsus area of southern Turkey. In Greece very marked physiological resistance to dieldrin was found in all the areas examined and was associated, at least in the Peloponnese, with similar resistance to DDT, affecting, however, only a part of the *sacharovi* population. In Italy and Romania, after 10 years' use of DDT, *sacharovi* is still susceptible to it; long use of BHC in Romania has not resulted in the development of resistance to dieldrin or to BHC. Further investigation of the situation in Iran is considered necessary.

"The fact that the use of DDT in Greece, after the development of resistance to this insecticide in 1951, has not resulted in the formation of a highly resistant mosquito population is considered to be due to the irritant effect of the DDT

on susceptible mosquitos, causing them to leave sprayed surfaces before they have picked up a lethal dose.

"The information to date points to the existence in *A. sacharovi* of two independent mechanisms of physiological resistance—one to DDT and another to dieldrin and BHC—which may or may not be present together."

[See also this *Bulletin*, 1956, v. 53, 539.]

PEFFLY, R. L. **Insecticide Resistance in Anophelines in Eastern Saudi Arabia.** *Bull. World Health Organization.* Geneva. 1959, v. 20, No. 5, 757–76, 2 figs. [16 refs.]

"In 1953, the fifth year of a malaria control programme with DDT in Eastern Saudi Arabia, the resting of *Anopheles stephensi* on recently sprayed surfaces suggested the development of resistance in this species to DDT, and this suspicion has been confirmed by tests carried out from 1955 to 1958.

"DDT was replaced by dieldrin in 1955 and malaria rates, which had been rising, were again reduced. No dieldrin-resistance has been found in local *A. stephensi* strains, and no *A. stephensi* have been collected from treated villages since the wide use of dieldrin.

"*A. pulcherrimus, A. coustani* var. *tenebrosus, A. fluviatilis* and *A. sergenti* have proved susceptible to DDT, but the first two have developed resistance to dieldrin. *A. pulcherrimus* was rarely collected before and during the use of DDT but has become increasingly frequent since the introduction of dieldrin. Its possible role in transmitting malaria in the area is discussed.

"Egg measurements and ratios on several series of eggs obtained from locally collected *A. stephensi* fall within the limits of the range set for *A. stephensi mysorensis*, not previously recorded outside India."

NARASIMHAN, D., KARANI, N. D. P. & KRISHNASWAMI, P. **Field Survey of Insecticide Susceptibility of Disease Vectors. Part 1a.** *Anopheles culicifacies* **in Poona.** *Indian J. Pub. Health.* 1959, Apr., v. 3, No. 2, 160–68, 2 graphs. [10 refs.]

"A field survey is described, undertaken to determine the susceptibility of *A. culicifacies* to DDT and Dieldrin, in a DDT-sprayed rural area about 4 miles from Poona Cantonment.

"The current WHO Test Kit and technique were used, with certain essential modifications.

"The superiority of night catches of *A. culicifacies* is stressed.

"The test strain of *A. culicifacies* was found to be highly susceptible to p-p′ DDT and pure Dieldrin (HEOD). A 15-minute exposure had to be employed for both to derive the probable values for their LC_{50} and LC_{90}. Based on the regression equations these values are respectively 0·55% and 3·89% for DDT; that for LC_{90} of Dieldrin was derived as 0·25%, whereas the one for LC_{50} was extrapolated as 0·31%. These findings are discussed in relation to those of other workers on *A. culicifacies*.

"The regression lines, for DDT and Dieldrin, fitted by visual adjustment, remarkably approximated to those based on the statistical method.

"An extension of the study to a number of military stations in India is indicated."

GAHAN, J. B. & HOFFMAN, R. A. **Residual Sprays for the Control of *Anopheles quadrimaculatus* in Buildings.** *Mosquito News*. 1959, June, v. 19, No. 2, 95–9.

Laboratory findings of LABRECQUE *et al.* (1958) and GAHAN and LABRECQUE (1959) [this *Bulletin*, 1958, v. 55, 1303; 1959, v. 56, 803] indicated that malathion, diazinon, Dicapthon, Ronnel (Korlan, Dow ET-57) and Barthrin [6-chloropiperonyl chrysanthemumate] had promising residual properties.

In this paper the authors describe a field trial with these insecticides. Over a period of a month interior surfaces of wooden farm buildings in the Stuttgart region of Arkansas were treated with emulsions of the insecticides to control *Anopheles quadrimaculatus*. These mosquitoes are normally found there throughout the summer. In most instances the insecticides were applied at a rate of 200 mgm./sq.ft. but, in addition, special treatments with malathion and Diazinon at 50 mgm./sq.ft. and with Barthrin and 2,4-dimethyl benzyl chrysanthemumate at 400 mgm./sq.ft. were also made. Three buildings sprayed with DDT at 200 mgm./sq.ft. were used as a standard of comparison for the series. To test the effectiveness of the insecticides, pre- and post-treatment counts were made of mosquitoes in the buildings.

The results indicate that malathion and Diazinon were the most effective of the compounds tested. Both gave 100% control after 3 weeks when sprayed at 200 mgm./sq.ft. Malathion continued to give 95% to 99% control for the remainder of the 10- to 11-week observation period. By 7 to 8 weeks after the initial treatment Diazinon had lost much of its effectiveness. DDT gave disappointing results at 200 mgm./sq.ft. (average of 77% reduction in mosquito infestation after 5 weeks). Poor results with DDT could possibly be attributed to the development of resistance; many farmers had previously made use of dusts containing DDT and BHC. Dicapthon and Ronnel were highly effective for at least 2 weeks (99 to 100% reduction in both cases) but gave only limited control for 4 to 5 weeks. Barthrin and 2,4-dimethyl benzyl chrysanthemumate had the weakest residual properties of all. At 200 mgm./sq.ft. both failed to give complete control after 2 weeks and most treatments were less than 90% effective within 3 weeks. At 400 mgm./sq.ft. both these insecticides were more efficient but still lost their effectiveness faster than Diazinon and malathion applied at 200 mgm./sq.ft.

The authors note that neither Diazinon nor malathion was highly repellent and that, while it remained effective, 2,4-dimethyl benzyl chrysanthemumate caused a rapid knock-down. *B. C. Fine*

TRYPANOSOMIASIS

*In this section abstracts are arranged as far as possible in the following order:—*African—*human, animal;* American—*Chagas's disease and other trypanosome infections. In each form the following order is followed:—epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control.*

MORRIS, K. R. S. **The Epidemiology of Sleeping Sickness in East Africa. Part I. A Sleeping Sickness Outbreak in Uganda in 1957.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1959, Sept., v. 53, No. 5, 384–93, 2 maps.

An outbreak of Gambian sleeping sickness in 1957 on the Aswa River at the junction of Lango and Acholi districts in Northern Uganda was traceable to an epidemic on the Albert Nile in 1909 to control which the population had been moved. Some of this population was moved 3 times to areas where *Glossina palpalis* were numerous and each time an epidemic broke out, in 1922, 1928 and 1935. The last resettlement was at Paranga on the Aswa River where, in spite of the establishment of a treatment centre, the disease remained endemic and broke out again in 1945. This was an exceptionally dry year and fly and man were concentrated around the residual pools in the river. Treatment and segregation controlled the disease until 1950 when routine survey of the population ceased. In 1955 a case of *T. gambiense* infection was detected and others followed and survey of the whole county in 1957 disclosed 157 cases of whom 70% were from an area of some 70 square miles. A mass treatment campaign was commenced and *G. palpalis* was attacked by spraying the riverine vegetation with 5% dieldrin which was found to control fly for over 100 days. Tsetse control was not carried beyond the edge of the area of the intense epidemic and was undertaken about 1 month after mass treatment. Subsequent surveys revealed 174 cases peripheral to the epidemic focus.

Important points in the epidemiology were the dense concentration of population along the river with resulting absence of game, including crocodiles, so that fly were driven to feed on man and his stock. There was an exceptional length of fly-infested river per unit area so that people were in almost continual contact with fly which could be found in and around the houses. There was an annual fishing season attracting people into very close contact with fly. It is emphasized that owing to the prolonged symptomless stage in Gambian trypanosomiasis, population movement and migration spread infection widely. It is recommended that in a combined attack on tsetse and trypanosome, the former should precede the latter if simultaneous operations are impossible, lest new infections continue to spread. Some early cases will escape detection if diagnosis rests on clinical appearance and examination of gland juice alone. *T. H. Davey*

GOBLE, F. C., FERRELL, B. & STIEGLITZ, A. R. **The Virulence and Drug Susceptibility of Certain Strains of Trypanosomes of the** *brucei-evansi* **Group maintained by Syringe Passage.** *Ann. Trop. Med. & Parasit.* 1959, June, v. 53, No. 2, 189–202, 7 figs. [41 refs.]

GEIGY, R., HUBER, M., WEINMAN, D. & WYATT, G. R. **Demonstration of Trehalose in the Vector of African Trypanosomiasis: the Tsetse Fly.** [Miscellanea.] *Acta Tropica.* Basle. 1959, v. 16, No. 3, 255–62. [15 refs.]

It is well known that species of African trypanosomes previously infective for mammals lose this character after maintenance *in vitro*. The characters of the trypanosomes in culture resemble structurally those developing in *Glossina* species, rather than those of blood forms. The factor present in insects bringing this about has not been recognized. The disaccharide trehalose (a non-reducing sugar which on hydrolysis yields 2 molecules of glucose) is known to occur in insects (WYATT and KALF, *Fed. Proc.*, 1956, v. 15, 388; *J. Gen. Physiol.*, 1957, v. 40, 833) but not in blood of mammals. WEINMAN [this *Bulletin*, 1958, v. 55, 377] has reported that the presence of this sugar in cultures of *T. rhodesiense* makes it infective for mammals.

It was therefore of some urgency to determine whether trehalose occurs in *Glossina*, and the following investigation, in which specimens of *G. morsitans* and *G. brevipalpis* numbering 672 whole flies, 428 intestines and 3,495 salivary glands were used, was carried out in East Africa. Rapid fixation of whole flies was effected in 70% alcohol hot or cold while they were alive. In the case of the intestinal tract and salivary glands which are concerned in trypanosome development, fixation in hot alcohol was necessary, otherwise enzymatic action brought about degradation of sugars present. After grinding, the tissues were extracted 3 times in 70% hot alcohol which was then removed under nitrogen gas or *in vacuo* about 50°C. The soluble portion of the residue was then taken up in water and passed through an ion exchange column for further purification. After the sugar had been converted to glucose by trehalose, estimation of micro quantities of glucose and trehalose was made enzymatically with glucose oxidase in presence of peroxidase and anisidine whereby a colour is produced. It was found by adding these two sugars to the preserved specimens that losses were occurring in the preserved material, and this fact makes accurate estimation of sugars present one of some difficulty.

Results showed that whole tsetse flies contained 0·1–4·0 mgm. trehalose, the intestine 10–19 mgm. and salivary glands trace amounts per 100 gm. fresh weight in each case. Glucose was also present in tissues in small amounts. These results suggest that the effect of trehalose on the developing trypanosomes is greatest before they reach the salivary glands. *J. D. Fulton*

SMITHERS, S. R. & TERRY, R. J. **Changes in the Serum Proteins and Leucocyte Counts of Rhesus Monkeys in the Early Stages of Infection with** *Trypanosoma gambiense*. *Trans. Roy. Soc. Trop. Med. & Hyg.* 1959, July, v. 53, No. 4, 336–45, 7 figs. [16 refs.]

3 female rhesus (*Macaca mulatta*) monkeys aged 9 months were infected intraperitoneally with *Trypanosoma gambiense* in rats' blood, and a similar uninfected monkey was observed as a control. The strains used were "Burroughs Wellcome CH" (2 monkeys each infected with 200 million parasites) which had been kept in laboratory animals since 1939, and "Kano" (600,000 parasites) isolated in 1957. The blood of the first 2 animals became parasite-positive by the third day; that of the last by the tenth day. The infection in the CH infected animals was controlled by an intravenous injection

of tryparsamide (10 mgm./kgm.); a similar dose of the drug was given to the control animal. After the injection parasites vanished from the blood; they recurred about a week later and were present irregularly in small numbers for a month; they then vanished and the blood did not infect mice on intraperitoneal inoculation 100 days after the infection of the monkey. The infection in the monkey infected with the Kano strain continued at a low level in the blood for some months before vanishing; at 100 days it similarly failed to infect mice.

Total and differential white cell counts and the serum protein patterns of each of the monkeys were studied at intervals for more than 100 days. The methods employed are detailed in the text. The results show that in the 3 monkeys infected with trypanosomes there was a lymphocytosis, which in the case of one of them (Kano strain) was marked (26,000/cmm.; *i.e.* more than twice that of the normal control). In all 3 there was an increase in gamma globulin and a decrease in serum albumin (both most marked in the Kano strain infection), leaving the total serum proteins fairly constant. The percentages of alpha and beta globulins were not much altered. These changes in the serum proteins are in accord with those reported as occurring in human trypanosomiasis in Africa [this *Bulletin*, 1955, v. 52, 258], and with those recorded as present in monkeys infected with strains of *T. rhodesiense*.

The rates of catabolism of autologous ^{131}I-labelled gamma globulin were measured before infection and 2 months thereafter (when the gamma globulin was much increased). After infection the gamma globulin was catabolized more rapidly than before it; the increase in gamma globulin therefore indicates a considerable increase in its synthesis; this may arise from the activity of the lymph nodes and be related to the lymphocytosis.

A. R. D. Adams

WOODRUFF, A. W. **Serum Protein Changes induced by Infection and Treatment of Infection with** *Trypanosoma rhodesiense* **in Monkeys.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1959, July, v. 53, No. 4, 327–35, 3 figs. [11 refs.]

Specimens of blood from 6 "monkeys" [genus and species not stated] carefully kept on a well-balanced diet and infected with the Tinde strain of *Trypanosoma rhodesiense*, controlled by repeated injections of Antrypol, after refrigeration overnight were examined at intervals over 50 weeks for their serum protein content and pattern. The outstanding change observed after infection was a rapid and marked increase in gamma globulin in the serum of the animals, and the rapid diminution in this on eradication of the infection by treatment. The gamma globulin content of the serum also quickly fell when parasitaemia ceased, though the infection remained latent. In spite of a lack of quantitative change in the gamma globulin in its serum one animal became immune to infection, though originally susceptible to it. Though antibodies are globulins, some of them gamma globulins, from this it seems that antibodies may be present in only a small fraction of the gamma globulin, and not in the whole of it. Indeed, in some animals with a high gamma globulin content of the serum the infection persisted and parasitaemia recurred. Disintegration products of trypanosomes and of leucocytes and macrophage cells may account for much of the globulin, and the antibody-containing

fraction of the gamma globulin may be specifically adapted to combine with and transport certain antigens.

While serum albumin values fell in these animals after infection the fall was not statistically significant; it approximated to the levels found in many human inhabitants of the tropics, many of whom suffer from chronic malnutrition and infective diseases. That malnutrition itself may be an important factor in the lowering of serum albumin values in human beings with trypanosomiasis is suggested by this study, during which the animals were optimally fed and maintained. Liver damage due to the infection in these animals may have contributed to reduction in their serum albumin content; possibly the latter could not adequately be replaced because of interference with its synthesis, or because of its conversion into globulin. *A. R. D. Adams*

BAKER, J. R. **The Effect of Nitrofurazone on** *Trypanosoma rhodesiense* **Infections in Mice.** *Brit. J. Pharmacol. & Chemotherapy.* 1959, Sept., v. 14, No. 3, 408–10.

Previous reports by different authors indicated that nitrofurazone was effective in the treatment of mice infected with *Trypanosoma equiperdum* and in mice and guineapigs infected with *T. gambiense*. But the drug was much less effective against *T. rhodesiense* infections in animals. Human infections with *T. gambiense* were also favourably affected whereas those with *T. cruzi* were not [this *Bulletin*, 1957, v. 54, 663; 1958, v. 55, 135, 136].

Because of these findings mice infected with a freshly isolated strain of *T. rhodesiense* were used in chemotherapeutic experiments with the drug which was given in a 3% w/v suspension in a 1% w/v gum acacia solution in water by the intraperitoneal route in 10 equal daily doses of 50, 100, 200 and 400 mgm./kgm. A total of 85 infected, along with 10 uninfected mice as controls, were used. It was found that trypanosomes disappeared from the blood after 2 or 3 doses of the drug but relapse followed. The survival time of infected mice was increased. The highest dose of drug was toxic and caused some deaths.

The results obtained so far do not appear promising for the therapeutic use of nitrofurazone in man. *J. D. Fulton*

DE LUCENA, D. T. *Panstrongylus megistus leucofasciatus* n. ssp. do Nordeste do Brasil. [*Panstrongylus megistus leucofasciatus*, **a New Species in North East Brazil**] *Rev. Brasileira Med.* Rio de Janeiro. 1959, July, v. 16, No. 7, 470–73, 1 fig. English summary.

BARTH, R. Estudos anatômicos e histológicos sôbre a subfamília Triatominae (Heteroptera, Reduviidae). X. Parte: Espermiohistogênese do *Triatoma infestans*. [**Anatomical and Histological Studies on the Triatominae. X. Spermohistogenesis of** *Triatoma infestans*] *Mem. Inst. Oswaldo Cruz.* 1958, Dec., v. 56, No. 2, 577–633, 87 figs. on 17 pls. [14 refs.] German summary.

WIGGLESWORTH, V. B. **The Histology of the Nervous System of an Insect, *Rhodnius prolixus* (Hemiptera). I. The Peripheral Nervous System.** *Quart. J. Microscop. Sci.* 1959, June, v. 100, Pt. 2, 285–98, 6 figs. (1 on pl.) [25 refs.] **II. The Central Ganglia.** *Ibid.*, 299–313, 7 figs. (4 on 4 pls.) [29 refs.]

ESCOSTEGUY, J. A. & ERTHAL, A. Megaesôfago. [**Megaoesophagus**] *Bol. Centro Estudos Hosp. Servidores Estado.* Rio de Janeiro. 1959, Aug., v. 11, No. 8, 374–80, 1 fig.

The English summary appended to the paper is as follows:—

"The paper consists of a lecture on actualization about megaesophagus, emphasizing the place of chagasic etiology in this condition, the role that the lesions of intramural nervous plexi play in its pathogeny, the importance and extent of megaesophagus problem in Brazil, and finally the clinical aspects and the available diagnostic measures."

[See this *Bulletin*, 1957, v. 54, 935; 1958, v. 55, 1209.]

LEISHMANIASIS

In this section abstracts are arranged as far as possible in the following order:—visceral, cutaneous, muco-cutaneous.

RÉS, J. F. Contribuição para o conhecimento da leishmaniose em Portugal. [**Observations on Leishmaniasis in Portugal**] *Anais Inst. Med. Trop.* Lisbon. 1957, Sept.–Dec., v. 14, Nos. 3/4, 527–45, 3 graphs & 2 figs. on pl. [13 refs.] English summary.

The English summary appended to the paper is as follows:—

"The author took advantage from his position as Public Health officer, to proceed with the researches of Instituto de Medicina Tropical investigators, concerning the distribution of *Phlebotomus* species over Portuguese territory in Europe.

"The survey, carried out in three regions where leishmaniasis is endemic, has shown that *P. perniciosus* is the predominant species, being associated with others, some in appreciable density too, like *P. papatasi* in the Guadiana watershed, *P. sergenti* in Lisbon city and suburbs and *P. ariasi* in the middle course of the Douro.

"In this last endemic region, the country's most important, contrary to what happened in the remainder, the antimalarial campaign with persistent insecticides, failed to produce parallel effects upon the leishmanial morbidity, creating a sanitary condition stimulant of new studies."

MITRA, R. D. **Notes on Sandflies. Sandflies of Punch and Riasi Districts of Kashmir.** *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1959, Apr., v. 10, No. 1, 56–66.

Cutaneous leishmaniasis and kala azar have been recorded from the mountainous south eastern part of Kashmir.

A survey of the species of *Phlebotomus* resting in houses, cattle sheds, caves and animal burrows showed that *P. sergenti* was the most frequent species encountered in all localities, *P. chinensis* was not common and *P. argentipes* was not found. *P. papatasi* was found in two localities in the south of the area surveyed, where short term fever is found among newcomers to the area, but sandfly fever has not been identified. Four other species of *Phlebotomus* were also recorded. The climate is severe with hot, humid summers and snow in winter. Sandflies were captured only from May to October when monthly average minimum temperatures are above 60°F., and the adults are apparently absent during the rest of the year.

Other insect-borne diseases noted as occurring in the area are malaria, which is hyperendemic, mite-borne typhus, tick-borne relapsing fever, and various enteric diseases. Louse-borne typhus and louse-borne relapsing fever are also suspected to exist in this part of Kashmir. *B. R. Laurence*

CAPPUCCINO, Elizabeth F. & STAUBER, L. A. **Some Compounds active against Experimental Visceral Leishmaniasis.** *Proc. Soc. Exper. Biol. & Med.* 1959, Aug.–Sept., v. 101, No. 4, 742–4.

In this study the 8-day method of the authors [this *Bulletin*, 1959, v. 56, 427] was used to screen various compounds against experimental visceral leishmaniasis in hamsters and mice. Treatment was given daily for 6 days starting on the day after inoculation. Liver impression smears were made on the 8th day and the parasites were counted in treated and untreated animals. Pentostam (sodium stibogluconate) was used as reference drug in all experiments and the route of administration was varied. The results of treatment are shown in tables, and in mice and hamsters showed good agreement. The activity of Amphotericin B and of its soluble derivative Fungizone was noteworthy. A dosage of 5 mgm./kgm. of the former produced the same result as 188 mgm. Pentostam. Activity was also shown by fumagillin, nystatin, antimony dimercaptosuccinate and Xerosin. *J. D. Fulton*

FEVERS OF THE TYPHUS GROUP

In this section abstracts are arranged as far as possible in the following order:—general; louse-borne typhus, flea-borne typhus, mite-borne typhus; rickettsialpox; tick-borne typhus; Q fever, other rickettsial diseases.

SMADEL, J. E. **Status of the Rickettsioses in the United States.** *Ann. Intern. Med.* 1959, Sept., v. 51, No. 3, 421–35, 4 figs. [52 refs.]

This paper gives a short account of the geographical distribution and trends of incidence of spotted fever, murine typhus, Q fever and rickettsialpox in the United States. The total number of persons who contract these diseases annually is thought to approach 1,000, and the fact that man is only accidentally involved in the cycles of infection which exist in arthropods and animals makes control difficult. Among factors which influence exposure to infection are

suburban development in spotted fever endemic areas and the movement of cattle and animal products from Q fever endemic areas. The need for early recognition of rickettsial infection is stressed; specific treatment is highly effective in arresting the disease. *R. S. F. Hennessey*

MICHON, P. Intérêt du séro-diagnostic des rickettsioses au cours d'accidents vasculaires. [**Importance of Serological Investigation for Rickettsial Infection in Vascular Syndromes**] *Bull. Acad. Nat. Méd.* 1958, v. 142, Nos. 11/12, 354–60. [23 refs.]

The sera from 8 patients with various vascular signs including arteritis, thromboangiitis, pyelophlebitis and necrotic purpura were tested against *Proteus* spp. and rickettsial suspensions. 7 had lived in tropical areas in which one or other form of rickettsial infection was endemic; the eighth came from a European region in which Q fever and boutonneuse fever had recently been discovered.

Agglutinins were present in all.

The author emphasizes the importance of excluding rickettsial infection in vascular syndromes. *B. G. Maegraith*

WEISS, E., DRESSLER, H. R. & SUITOR, E. C., Jr., with the technical assistance of I. E. FISHBURNE. **Inhibition by Acetylsalicylic Acid of Rickettsial Strains Resistant to *p*-Aminobenzoic Acid.** *J. Bacteriology.* 1959, Sept., v. 78, No. 3, 432–40, 2 figs. [26 refs.]

Rickettsial growth studies in chick embryos showed that mutants of *Rickettsia prowazeki* (Madrid E) which were resistant to *p*-aminobenzoic acid [this *Bulletin*, 1959, v. 56, 707] were inhibited by salicylic acid and acetylsalicylic acid in concentrations which did not affect the parent strain. Susceptibility to acetylsalicylic acid was greater than to salicylic acid and appeared to increase with the degree of *p*-aminobenzoic acid resistance. Inhibition by acetylsalicylic acid was reversed by *p*-aminobenzoic acid, but not by 10 other compounds chemically related to *p*-aminobenzoic acid or known to be involved in the *p*-aminobenzoic acid metabolism of other organisms. It was also observed that the reversing effect of *p*-aminobenzoic acid on acetylsalicylic acid inhibition was antagonized by *p*-hydroxybenzoic acid. Serial passage in eggs of a *p*-aminobenzoic acid-resistant strain in the presence of acetylsalicylic acid yielded a strain which was resistant to acetylsalicylic acid while retaining most of its resistance to *p*-aminobenzoic acid.

The significance of these results is discussed. It is suggested that they may be explicable in terms of drug competition at specific transport and enzymatic sites involved in the utilization of *p*-hydroxybenzoic and *p*-aminobenzoic acids. *R. S. F. Hennessey*

HSU, Ping-Kuen, SU, Ke-Chin & CHEN, Hsin-Tao. [**Larvae of *Trombicula akamushi* var. *deliensis* as related to the Epidemiology of Tsutsugamushi**] *Acta Microbiologica Sinica.* 1959, May, v. 7, Nos. 1/2, 1–9, 1 chart. [In Chinese.]

The English summary appended to the paper is as follows:—

"1. The results of study in the last 3 years, indicate that *T. akamushi* var.

deliensis in the Canton region has a clear-cut seasonal distribution, the larvae being fewer in number from December to March, but in greatest quantity in June–July and September–October. Apparently the seasonal distribution is closely related to climatic conditions.

"2. Cases of tsutsugamushi reported from Canton not only vary in seasonal distributions, but also in localities. In the last 3 years most of the cases have been reported in June–July and September–October (coinciding with the two *Trombicula* peaks), particularly in June (27·2%). In some localities, the disease has been most prevalent in slum areas.

"3. Metereological data indicate that cases of tsutsugamushi appear most abundantly after a month or so of heavy rain.

"4. Temperature affects directly the number of *Trombicula* larvae that may appear at a given time, and the heavy rain affects the dispersion of the larvae, hence increasing the chance of contact between man and the vector. As a result, more cases of tsutsugamushi may eventually appear. Poor sanitary conditions in addition to favorable climatic conditions for the vectors aggravate the situation, so that an epidemic of tsutsugamushi may eventually break out. Further, environmental conditions may also alter one way or the other how rain affects the dispersal of the *Trombicula* larvae. These facts explain why cases are more concentrated in certain areas of the city.

"5. On the basis of experiments and observations, methods of control of tsutsugamushi, including the choice of time, are proposed."

YU, En-Shu & WU, Hsien-Yi. [**Further Study on the Different Types of** *Trombicula deliensis* **and Transovarian Transmission of** *Rickettsia orientalis*] *Acta Microbiologica Sinica.* 1959, May, v. 7, Nos. 1/2, 10–15. [In Chinese.]

The English summary appended to the paper is as follows:—

"In a previous paper, we reported differences in the morphological and miticide-response between the larval stage of 2 types of *T. deliensis* in Ping-Tang, Fukien. In this paper, our further observation on the differences in miticide-reaction in larva and the morphological differences in nymph and adult of these 2 types of *T. deliensis* were reported. Present findings confirmed our previous observation.

"*Rickettsia orientalis* were isolated from nymph grown from infective larva, and larva of second generation bred in the laboratory. This result shows that *R. orientalis* can be carried to the next generation through transovarian transmission. This first successful isolation of *R. orientalis* from nymph stage of mites indicates the possibility of maintenance of virulence of *R. orientalis* in different developmental stages of *T. deliensis*."

TWOREK, R. & SEROKOWA, Danuta. Badanie bydła w kierunku gorączki Q za pomocą kapilarnego odczynu aglutynacji z mlekiem w północno-wschodnich województwach Polski. [**Investigations on Q Fever in Cattle in North-Eastern Provinces of Poland. Capillary Agglutination Test with Milk**] *Przeglad Epidemiol.* Warsaw. 1959, v. 13, No. 3, 273–6, 1 map. [13 refs.]

The English summary appended to the paper is as follows:—

"In the three North-Eastern provinces of Poland 9558 cows belonging to

219 herds have been examined for infection with R. burneti by the Luoto method (capillary agglutination test with milk). Negative results were obtained. In consequence it seems safe to assume that there are no enzootical foci of Q-fever in the above named provinces."

STOENNER, H. G., HOLDENRIED, R., LACKMAN, D. & ORSBORN, J. S., Jr. **The Occurrence of *Coxiella burneti*, *Brucella*, and other Pathogens among Fauna of the Great Salt Lake Desert in Utah.** *Amer. J. Trop. Med. & Hyg.* 1959, Sept., v. 8, No. 5, 590–96. [13 refs.]

" Strains of *Coxiella burneti* were isolated from *Dipodomys ordii*, *D. microps*, *Peromyscus maniculatus*, and *Dermacentor parumapertus* collected in the Great Salt Lake Desert in Utah. In addition, antibodies against *C. burneti* were found in serums of *Lepus californicus*, *Onychomys leucogaster*, and *Eutamias minimus*. Other organisms enzootic in fauna in this area were *Rickettsia rickettsii*, *Brucella neotomae*, *Br. suis*, *Pasteurella tularensis*, *P. pestis*, and Arizona group (Paracolon)."

ROMAÑA, C., ROLDÁN, L., TORRICO, R. & MAYER, H. Primer caso agudo de fiebre " Q " diagnosticado en la Argentina. (Nota previa.) [**First Acute Case of Q Fever diagnosed in Argentina**] *Semana Méd.* 1959, Sept. 24, v. 115, No. 13, 506–7, 513, 2 figs.

YELLOW FEVER

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control.

TINKER, M. E. & HAYES, G. R., Jr. **The 1958 *Aedes aegypti* Distribution in the United States.** *Mosquito News.* 1959, June, v. 19, No. 2, 73–8, 2 figs.

Since the last survey [this *Bulletin*, 1959, v. 56, 431], a further reduction in the distribution of *Aëdes aegypti* in the United States is reported here, and this is illustrated by two maps. An extensive area in the south-east United States is still occupied by this species and the authors comment that urban epidemics would be dangerous if yellow fever virus were introduced into some communities, notably in Texas, Alabama, Georgia and South Carolina.

B. R. Laurence

DENGUE AND ALLIED FEVERS

DIERCKS, F. H. **Isolation of a Type 2 Dengue Virus by Use of Hamster Kidney Cell Cultures.** *Amer. J. Trop. Med. & Hyg.* 1959, July, v. 8, No. 4, 488–91, 1 fig.

Acute-phase sera from 5 dengue patients, which had been stored on dry ice since 1945, were inoculated into hamster kidney cultures. 10 days later

4 of the 5 sets of tubes showed some cytopathic effect. The material was passaged to further tubes, but no cytopathic changes were detected. Material from one of the groups of first passage cultures was also inoculated intracerebrally into suckling mice. Passage in these resulted in the isolation of dengue 2 virus. It is suggested that the use of tissue cultures in this way as an "enrichment procedure" may assist in making difficult virus isolations.

C. E. Gordon Smith

See also p. 190, NAKAGAWA & HIRST, **Current Efforts in Mosquito Control in Hawaii.**

GERLOFF, R. K. & LARSON, C. L. **Experimental Infection of Rhesus Monkeys with Colorado Tick Fever Virus.** *Amer. J. Path.* 1959, Sept.–Oct., v. 35, No. 5, 1043–54, 4 figs. [13 refs.]

The Florio strain of virus was used. Mouse brain material was given intravenously or subcutaneously to rhesus monkeys. In titrations in mice, deaths 3–14 days after inoculation were regarded as specific. Apart from bloody diarrhoea in 1 monkey on the first day after inoculation and a febrile response in 3, the monkeys showed no symptoms. All the monkeys exhibited viraemia lasting from 15–50 days with an average of about 36 days. The size of dose of virus did not much affect the height and duration of viraemia, but onset was delayed with smaller doses. Viraemia remained at a maximum for about 5 days and then gradually diminished. Previously infected monkeys were challenged with another dose: varying degrees of immunity prevented viraemia or greatly shortened its duration. On autopsy no macroscopic or microscopic lesions were found in the monkeys except "prominent, partially hyalinized reaction centers . . . in splenic lymphoid nodules" and these were of dubious significance. 6 days after inoculation virus was abundant in all tissues tested, especially the bone marrow. 28 days after inoculation only small amounts of virus could be detected in blood, spleen and kidney, but in no other organs. Leucopenia was found in infected monkeys associated with a decreased proportion of neutrophils and a relative increase in lymphocytes. The time of appearance of antibody varied from the 13th to after the 20th day.

C. E. Gordon Smith

RABIES

JELESIC, Z. & JOVANOVIC, L. Welche Faktoren beeinflussen das Erscheinen des Tollwutvirus im Speichel infizierter Tiere? **[What Factors influence the Appearance of Rabies Virus in the Saliva of infected Animals?]** *Arch. f. Hyg. u. Bakt.* 1959, June, v. 143, No. 4, 312–15.

Mice were infected intracerebrally with fixed rabies virus, and the titre of virus in the brain and its presence in the salivary glands were determined in animals killed at intervals up to 9 days after infection. Virus appeared in the salivary glands on the 4th day, when the titre in the brain had risen to 3·5 log units, and was present throughout the remainder of the period of observation. In a repetition of the experiment in which a 100-fold smaller dose of

virus was used for infection the virus appeared in the salivary glands on the 7th day, when the titre in the brain had risen to 4·5 log units.

[See also this *Bulletin*, 1958, v. 55, 883.] *D. J. Bauer*

NIKOLITSCH, M. Über die Vermehrung des Tollwutvirus im menschlichen Organismus. **[The Multiplication of Rabies Virus in the Human Body]** *Arch. f. Hyg. u. Bakt.* 1959, June, v. 143, No. 4, 305–11. [10 refs.]

The author discusses the evidence in favour of the possibility that rabies virus may multiply to a certain extent in man without producing symptoms, and quotes cases reported in the literature in which autopsies carried out on persons who had been bitten by rabid animals and had died from other causes provided evidence of the presence of infection with rabies virus. A relevant case history from the records of the Pasteur Institute in Novi Sad, Yugoslavia, is then described. A man aged 24 was bitten by a dog in 1931, and was given 4 injections of Hempt vaccine. 4 weeks after the injury he developed tetanus and died. No Negri bodies could be found, but a suspension of brain material injected into rabbits produced typical rabies after an incubation period of 20 days. *D. J. Bauer*

KHEMANI, K. M. **Importance of Biological Tests in the Diagnosis of Rabies.** *Indian J. Med. Sci.* 1959, Jan., v. 13, No. 1, 17–20.

It is generally accepted that the Negri body is specific for rabies and that its presence in the nerve cells of a suspected animal's brain invariably indicates this infection. Since, however, Negri bodies cannot always be found in the brains of animals dying of rabies, it is of importance that animal inoculation for demonstration of the virus be done on Negri-negative specimens—an importance reflected in the results of rabies diagnosis at the Haffkine Institute, Bombay, during the 6-year period 1952–1957.

There it was found that of 139 animal brains, which on histological examination had failed to reveal the presence of Negri body in Ammon's horn, cerebral cortex or cerebellum, 42 (30·2%) proved to be positive when inoculated intracerebrally into 4-week-old white mice. This percentage, high in comparison with the findings of other workers cited in the text (6·7–12·4) may be explained on the grounds that in India rabies is highly endemic and virus strains apparently incapable of producing Negri body are not uncommon. As regards the first of these explanations, LEACH [*Amer. J. Pub. Health*, 1938, v. 28, 162; this *Bulletin*, 1938, v. 35, 644], while reporting on his findings of 12% of brain specimens as positive by the biological test after being declared negative on microscopic examination, observed that such diagnostic error depends on the prevalence of the disease in particular geographical areas from which the specimens for diagnosis are received and that in regions of high endemicity one might expect a high percentage of Negri-negative specimens to prove positive on animal inoculation.

[According to the *World Health Organization Monograph Series* No. 23, 1955, p. 37 (this *Bulletin*, 1954, v. 51, 1242) "Extensive surveys of large numbers of rabies cases have shown that 10%–15% of those cases proved positive by mouse inoculation had been missed by direct-smear microscopic examination for Negri bodies".] *G. Stuart*

DUNDAS-TAYLOR, B. **Bovine Rabies in Nyasaland. Report on Two Unusual Features.** *Bull. Epizootic Dis. of Africa.* 1959, June, v. 7, No. 2, 191–3.

A calf aged 16 days ceased suckling, began to salivate and went down on its knees. 3 to 4 days later it staggered about aimlessly and although the suckling instinct was manifested by search for the teats of the dam, the calf was unable to suckle: it stood in the suckling position for about 5 seconds, then staggered off in a daze. The temperature rose to 106°F. on the fourth morning and the calf died the same evening. Negri bodies were found in sections of the hippocampus and mice inoculated with the material developed symptoms of rabies on the 8th day. Negri bodies were found in the mice.

Two cases of rabies occurred later in adult cattle on the same farm. Rabies was confirmed histologically in both and in one animal a biological test of the salivary gland was positive, with results in the mice similar to those described above.

The author, who writes from the Veterinary Research Laboratory, Blantyre, Nyasaland, describes a quick method of preparing brain tissues for examination for rabies. This was used together with the usual longer method in the case of the calf's brain, with equal success. The method is as follows:

1. Very thin slices of hippocampus are fixed in Zenker's fluid for 1 hour and extra thin sections are cut and fixed in absolute alcohol for 15 minutes, followed by acetone for 15 minutes and benzol or xylol for 30 minutes.
2. The sections are set in 65°C. boiled paraffin wax for 5 minutes and after embedding the wax is dried in a refrigerator for 10 minutes.
3. Sections are cut and reversed rapidly through xylol, absolute alcohol, 95% and 70% alcohol and distilled water.
4. Lugol's iodine is applied for 2½ minutes and the preparation is washed with 5% sodium thiosulphate for 2½ minutes.
5. Staining is carried out with fast green.

It is claimed that this reduces the time for histological examination to about 2½ hours: this time is shortened to 1½–2 hours if the tissues have already been preserved in Zenker's fluid. *H. J. O'D. Burke-Gaffney*

HSU, H. L., NI, E. L., HUANG, H. C. & CHU, C. M. **[Comparative Studies on Rabies Vaccine prepared with Sheep, Rabbit and Mouse Brains]** *Acta Microbiologica Sinica.* 1959, May, v. 7, Nos. 1/2, 60–65. [In Chinese.]

The English summary appended to the paper is as follows:—

"The authors prepared rabies vaccine by infecting sheep, rabbit, and mice, and the brain materials treated with phenol according to Semple's method. They found that:

"1. Among the three vaccines, that prepared from the sheep brain material was most resistant to heat and to phenol, and it remained potent longest when stored either at 37°C or at 5°C.

"2. The fixed virus passed through the mouse brain showed the highest virulence for the white mice.

"3. The sheep brain contained least toxic materials when it was injected intravenously into white mice.

"4. All three vaccines contained a factor which would induce the production of allergic encephalitis in the guinea pigs."

BUGYAKI, L., with the collaboration of J. H. M. MOONS & S. R. BLOCKEEL. La survie du virus fixe de Pasteur dans le vaccin antirabique phénique type Fermi-Semple et sa relation avec le degré d'immunité conférée. **[The Survival of Pasteur's Fixed Virus in Phenolized Anti-Rabies Vaccine of the Fermi-Semple Type and its Relation to the Degree of Immunity Conferred]** *Ann. Soc. Belge de Méd. Trop.* 1959, June 30, v. 39, No. 3, 275–80.

Experimental work by COURTOIS and WIKTOR (*Bull. Off. Int. Epiz.*, 1954, v. 41, 1081) had already shown that the virus titre of phenolized anti-rabies vaccine falls rapidly during the first 2 days after its preparation and thereafter falls much more slowly to reach a very low level at the end of 3 months' storage in the refrigerator at between +2°C. and +5°C. To determine the relationship between that type of vaccine's live virus content and its immunizing power at various intervals of time after its preparation was the object of the present study. For comparison this relationship was also similarly investigated in respect of a non-phenolized fixed virus brain emulsion stored at −25°C.

The vaccine used in the experiments consisted of a 5% tissue suspension in 1% phenolized physiological salt solution of emulsified brain from sheep inoculated with fixed rabies virus (Louis Pasteur strain). The virus content of the brain emulsion before and at different times after the addition of phenol was determined by the intracerebral inoculation of white mice and expressed as the LD50 for these animals. Determinations of immunizing power, the degree of protection conferred on immunized white mice, were made by HABEL's test. Challenge of the immunized mice was made with the same strain of fixed virus as that used for vaccine production.

Results showed that, whereas in the case of the non-phenolized emulsion the original virus titre decreased progressively during 4 months' storage at −25°C., in the case of the phenolized preparation the titre decreased, at first rapidly during the 24 hours' period of attenuation at 22°C., and then slowly, until at the end of 3 months' storage at between +2°C. and +5°C. intracerebral inoculation of white mice failed to reveal any remaining live virus. Moreover with the decrease in the titre of both phenolized and non-phenolized preparations there was noted a corresponding decrease in immunizing power.

A direct relationship between the quantity of live virus and the degree of immunity conferred would thus appear to be established. *G. Stuart*

POWELL, H. M. & CULVERTSON, C. G. **Action of Rabies Vaccine derived from Embryonated Duck Eggs against Street Virus.** *Proc. Soc. Exper. Biol. & Med.* 1959, Aug.–Sept., v. 101, No. 4, 801–3.

This paper gives the results of: (a) experiments in which rabbits after immunization with duck-embryo (DE) inactivated anti-rabies vaccine were challenged intracerebrally with street virus and (b) virus neutralization tests of human sera after treatment with DE and Semple vaccines, respectively.

As regards (a): 8 rabbits (5–6 lb. weight) were each given a subcutaneous dose of 1·5 ml. of 2% DE vaccine daily for 24 days. One week after the last dose the rabbits, divided into pairs, were inoculated intracerebrally with 0·25 ml. of street virus diluted 1 in 200, 1 in 400, 1 in 800 and 1 in 1,600, respectively. Control rabbits were similarly inoculated with these virus dilutions. 6 of the 8 immunized rabbits survived challenge with otherwise fatal

doses (up to 32) of street virus—a successful resistance paralleling that obtained by SEMPLE (*Scientific Memoirs*, Calcutta, 1911, No. 44) in various animals challenged subdurally with street virus after their immunization with phenolized vaccine in identical total dosage.

As regards (b): the neutralizing action of both types of sera was tested against standard challenge (CVS) fixed virus, against 2 other fixed viruses and against street virus. These tests for the determination of virus-neutralizing antibody involved the use of doubling dilutions of inactivated serum and virus so diluted that mice inoculated with the mixtures each received 100 mouse LD50 of virus; antibody titres were computed by the method of REED and MUENCH. Results showed that both types of human sera neutralized the 3 different fixed viruses and also the street virus, but their antibody titres were alike highest (1,010–2,450) against CVS and lowest (128–142) against street virus. *G. Stuart*

MÖBEST, H. Experimenteller Beitrag zur kombinerten Semple- und Hempt-behandlung. Konzequenzen für die Hemptbehandlungsmethode bei Tollwut. [**Experimental Observations on Combined Semple and Hempt Methods. Implications for the Hempt Method in Rabies**] *Arch. f. Hyg. u Bakt.* 1959, Apr., v. 143, No. 3, 192–203. [10 refs.]

GORDILLO, C. H. Complicaciones oculares por la vacuna antirrábica. [**Ocular Complication of Antirabies Vaccination**] *Rev. Facul. Med. de Tucumán.* 1958, July, v. 1, Nos. 1/2, 99–101.

The English summary appended to the paper is as follows:—

"In an attempt to divulge a well-known clinical fact, a case of antirabic vaccination with ocular complication, hyperaemia of the papilla with turbid border, is presented."

PLAGUE

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, rodent hosts, transmission, pathology, diagnosis, clinical findings, treatment, control.

CAVANAUGH, D. C. & RANDALL, R. **The Role of Multiplication of *Pasteurella pestis* in Mononuclear Phagocytes in the Pathogenesis of Flea-Borne Plague.** *J. Immunology.* 1959, Oct., v. 83, No. 4, 348–63, 9 figs. [16 refs.]

It is just over 45 years ago that BACOT and MARTIN [this *Bulletin*, 1914, v. 3, 201] made the most interesting observation that whereas *Pasteurella pestis* from the blocked stomachs of fleas were readily phagocytosed by the observers' sera there was no evidence of such phagocytosis with *P. pestis* obtained from spleens of rats dying of plague. In spite of the overwhelming epidemiological evidence incriminating the rat flea as a vector of the disease they were forced to conclude that the plague bacillus growing in the stomach of the flea lost

virulence, but they were unable to offer any explanation for the obvious high infectivity of the regurgitated organisms while the flea was feeding on its victim. In more recent years this problem of virulence and phagocytosis of *P. pestis* has been re-examined by BURROWS and his co-workers [*Bull. Hyg.*, 1956, v. 31, 229; BURROWS and BACON, this *Bulletin*, 1956, v. 53, 1424; 1957, v. 54, 283] who found that virulent strains of *P. pestis* are resistant to phagocytosis by mouse polymorphonuclear leucocytes, but that avirulent strains are regularly phagocytosed by these cells and that this property was directly related to the ability of virulent strains to develop not only Fraction I antigen but also additional fractions named "V" and "W".

The present authors, in their investigations, confirm these earlier findings but show that virulent *P. pestis* multiplying rapidly in the stomach of the flea has no detectable Fraction I (envelope) antigen and that the organisms that are phagocytosed are phagocytosed by polymorphonuclear leucocytes and are destroyed. But there are others that are phagocytosed by monocytes; these are not destroyed but multiply intracellularly and by the time they are released by the monocytes they have developed resistance to both polymorphs and monocytes.

The infectivity of any regurgitated feed would appear to depend on the concentration of *P. pestis* in the state that is rich in Fraction I antigen and consequently resistant to phagocytosis by polymorphonuclear leucocytes but not to the action of the mononuclear cells. *H. J. Bensted*

WINTER, Carrie C.; MOODY, M. D. **Rapid Identification of** *Pasteurella pestis* **with Fluorescent Antibody. I. Production of Specific Antiserum with Whole Cell** *Pasteurella pestis* **Antigen** [WINTER & MOODY]. *J. Infect. Dis.* 1959, May–June, v. 104, No. 3, 274–80. [20 refs.] **II. Specific Identification of** *Pasteurella pestis* **in Dried Smears** [WINTER & MOODY]. *Ibid.*, 281–7, 3 figs. [10 refs.] **III. Staining** *Pasteurella pestis* **in Tissue Impression Smears** [MOODY & WINTER]. *Ibid.*, 288–94, 1 fig. [19 refs.]

I. The serological reactions of *Pasteurella pestis* and *Pasteurella pseudotuberculosis* were first investigated by cross-agglutination tests. Antisera were made against 3 *P. pestis* antigens—namely, formalinized whole cells, the soluble antigen liberated into the culture medium (Fraction I), and bacteria heated at 100°C. for 2 hours—and against formalinized whole cells of each of the 5 serological types of *P. pseudotuberculosis*. The agglutination reactions of 29 strains of *P. pestis* and 19 strains of *P. pseudotuberculosis* with these sera were determined. Sera made with whole cells or Fraction I were found to be specific for plague bacilli. High-titre sera were best produced by using as antigen formalinized whole cells of a strain which produced much Fraction I and which had been grown in a casein-hydrolysate-mineral-glucose medium for 3 days at 37°C. [this *Bulletin*, 1954, v. 51, 1243].

II. Fluorescent plague antibody was made by conjugating fluorescein isocyanate with globulin prepared from such a high-titre serum by ammonium sulphate precipitation. Smears from cultures of *P. pestis* stained well with fluorescent antibody if the smear was fixed by heat, but smears fixed with alcohol and with formalin gave poor results. Smears of bacteria other than *P. pestis* did not show fluorescence when treated with plague fluorescent antibody. *P. pestis* grown at 25°C. instead of 37°C. failed to stain. The

fluorescent antibody preparation remained fully active after 1 year's storage at 0–5°C.

III. The identification of *P. pestis* by fluorescent antibody was also attempted in smears from infected tissue. Impression smears and cultures from mice infected with plague were made after death, from spleen, liver, lung and heart blood. Spleen contained most organisms. *P. pestis* could be detected by fluorescent antibody in smears from mice killed 2 to 3 days after the intraperitoneal injection of 20–25 bacilli. This method allows a serological identification of plague to be made 2 days sooner than the usual method of animal inoculation followed by culture and agglutination. *I. B. R. Duncan*

CHOLERA

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

POLLITZER, R. **Cholera.** With 2 chapters written in collaboration with W. BURROWS & S. SWAROOP. *World Health Organization Monograph Series No. 43.* 1019 pp., illustrated. [Numerous refs.] 1959. Geneva: Palais des Nations. [Sales agent for U.K., H.M. Stationery Office.] [£5; $20.00; Sw.fr. 60.–.]

This is the monograph form of the series of papers abstracted separately in this *Bulletin* from 1954, v. 51, 1154 to 1958, v. 55, 398.

RANANAVARE, M. M., GADGIL, R. K. & PANSE, M. V. **Cholera Epidemic in Poona. Bacteriological Investigation.** *Indian J. Med. Sci.* 1959, Aug., v. 13, No. 8, 699–703. [12 refs.]

This is an account of the routine laboratory procedures concerned with the isolation and identification of *Vibrio cholerae* in the Poona outbreak in March 1957. It was an explosive outbreak with more than 100 cases in the first 3 days. From 90 stool specimens, plated directly on litmus lactose bile salt agar, *V. cholerae* was isolated from 29. In addition an El Tor vibrio was isolated from another specimen. The usual biochemical and serological procedures were followed and all the strains of cholera vibrios except one were found to be of the Ogawa type. *H. J. Bensted*

OUCHTERLONY, Ö. **A Selective Medium for isolating Cholera Vibrios.** *Acta Path. et Microb. Scandinavica.* 1958, v. 43, No. 3, 274–84. [15 refs.]

The author first discusses suitable transport media for faecal specimens for cholera examination and confirms that the buffered sea salt solution of VENKATRAMAN and RAMAKRISHNAN [this *Bulletin*, 1942, v. 39, 458] is most satisfactory. When the specimen contained many vibrios the long-established alkaline peptone water medium was found to be as good as any, but when this failed, Aronson's agar or starch-tellurite agar media were to be preferred.

Both these alkaline agar media can be prepared without difficulty, but whereas different batches of Aronson's alkaline fuchsin-dextrin-saccharose-agar may vary considerably in their selectivity, the alkaline neutral-red starch-tellurite agar gives very regular results. The best batches of Aronson's medium are superior to the starch-tellurite medium, but with this reservation the latter would seem to be the more reliable.

The colonies of *Vibrio cholerae* as they appear on the starch-tellurite medium after 48 hours' incubation are described as smooth opaque colonies with an entire edge, reddish-grey in colour with black conical centres. The clear zone is usually well marked, but this halo can be emphasized by the application to the colony of a drop of potassium iodide. As a general rule colonies of coliform organisms can readily be distinguished. *H. J. Bensted*

NIKONOV, A. G., YEVSEYEVA, V. I., BIBIKOVA, P. D. & BICHUL', K. G. **Cultivation of *Vibrio comma* in the Small Intestine of Guinea-Pigs.** *J. Microbiol., Epidemiol. & Immunobiol.* London. 1958, v. 29, No. 12, 1925–7. [Translated from Russian.]

In attempting to enhance the virulence of degraded stock strains of *Vibrio cholerae* and to induce R—S changes the authors found that the results obtained by intraperitoneal guineapig passage were inconstant, and even when the method was successful the enhancement of virulence was only temporary, for degradation recurred quite quickly in the dried cultures prepared from this method of passage. When, however, they applied DE and CHATTERJE's intestinal-loop technique [this *Bulletin*, 1954, v. 51, 581] in the rabbit they found that relatively small doses of *V. cholerae* injected into the lumen of an isolated loop of the small intestine multiplied rapidly and produced a considerable blood-stained exudate containing almost pure cultures of high virulence vibrios.

Similar experiments with fasting guineapigs produced even more striking results. The day after an injection of about 10,000 cholera vibrios the isolated loop of a small intestine was swollen and oedematous and the lumen contained a cholera-like rice-water exudate teeming with vibrios. After 5–6 intestinal-loop passages the exudate was virtually a pure culture of cholera vibrios of high virulence.

When this exudate was dried *in vacuo* it was found that the contained vibrios retained their virulence for much longer periods than the normally dried sucrose-gelatin suspensions of vibrio cultures. It is noted, however, that certain strains persistently failed to show any increase in virulence under this treatment but the majority behaved as described above. *H. J. Bensted*

MUKERJEE, S., GUHA ROY, U. K., GUHA, D. K. & RUDRA, B. C. **Studies on Typing of *Vibrio cholerae* by Bacteriophage. Part II: Further Observations with Strains from Calcutta Epidemics.** *Ann. Biochem. & Exper. Med.* Calcutta. 1959, May, v. 19, No. 5, 115–24, 3 figs.

The typing phages were isolated from the stools of cholera patients and found to belong to four distinct groups. Of the phage types of *Vibrio cholerae*, type 1 was lysable by all 4 groups of phages, type 2 by group

phages II, III and IV but not by I, type 3 vibrios were insensitive to group II, type 4 vibrios were insensitive to group I and II phages, and type 5 vibrios insensitive to group III phages. Type 2 vibrios could be further classified into three sub-types (a, b and c) by adaptation of a group I phage to these strains of vibrios.

Some 600 strains of *V. cholerae* from Calcutta epidemics were phage-typed according to the scheme outlined above. Only about 1% was found to be untypable and type 1 was found to be the predominating type during the period of observation. No correlation between serological and phage types could be demonstrated. The epidemiological value of the phage-typing scheme employed has been confirmed in a few localized outbreaks where a group of cases could be traced to a single source. [This type of epidemiological investigation is very difficult to pursue in the highly endemic area of Calcutta where the infection is maintained throughout the year, especially in the wards bordering on the Chetla and Circular Canals. Further results of such studies will be awaited with interest.] [For Part I, see this *Bulletin*, 1958, v. 55, 651.]

H. J. Bensted

JENKIN, C. R. & ROWLEY, D. **Toxic Proteins from *Vibrio cholerae* and Water Vibrios which are Lethal for Mice.** *J. General Microbiol.* 1959, Aug., v. 21, No. 1, 191–202, 1 fig. [19 refs.]

Although it has been assumed by many workers that a specific toxin is released during the growth of *Vibrio cholerae* and that this toxin is responsible for the manifestation of the disease, evidence in favour of this assumption is rather confused and it cannot be readily proved since the disease is not reproducible in experimental animals. The Boivin type extract of most Gram-negative bacilli can be shown to contain the O-antigenic specificity of the parent organism but this is by no means clear in the case of *V. cholerae*. Several different toxins have been reported [this *Bulletin*, 1945, v. 42, 807 *bis*; 1957, v. 54, 681] but their relationship to each other has not been clearly defined and it is not known what their quantitative importance is to the overall toxicity of the cholera vibrio.

In the experiments described in this paper standard cholera strains, Inaba, Ogawa and Hikojima, from the National Collection of Type Cultures, Colindale, and several Ogawa strains from India were employed. 3 water vibrios from India were also included. By dissolving the various vibrios in 2·5 M urea, followed by fractional precipitation with ammonium sulphate, toxic protein fractions were regularly isolated. Estimations of the percentage recovery of toxicity indicated that the protein toxin isolated by this method accounted for the major portion of the toxicity of the whole organism. A toxic protein could also be isolated from the Boivin antigen, and immunological data suggested that this was identical with the protein toxin isolated from the whole organisms.

The acid-insoluble toxin isolated by FRETER [this *Bulletin*, 1957, v. 54, 681], which was thought by him probably to represent the acid-soluble toxin firmly bound to a protein fraction, appears to be very similar to the one described in this paper. The authors, in drawing attention to this similarity, suggest that the low toxicity of Freter's protein was possibly due to his method of extraction and precipitation.

The percentage recovery of toxicity in the protein extract of the cholera and water vibrios was not significantly different. Jenkin and Rowley emphasize that in the present work only those fractions of *V. cholerae* responsible for the lethal effect of the whole organism injected into mice have been considered. Death from the injection of any of these toxic fractions was rarely, if ever, accompanied by diarrhoea and it therefore seemed unlikely that they led to any gross changes in intestinal permeability.

The yield of purified lipopolysaccharides was of the same order as the yield from other Gram-negative organisms, but compared with extracts from *Escherichia coli* the toxicity of the extracts tested was very low.

H. J. Bensted

DUTTA, N. K., PANSE, M. V. & KULKARNI, D. R. **Role of Cholera Toxin in Experimental Cholera.** *J. Bacteriology*. 1959, Oct., v. 78, No. 4, 594–5.

Cholera toxin was prepared after the method of GALLUT [this *Bulletin*, 1954, v. 51, 1060] from Inaba passaged strains. The preparation used had an LD50 for 16–18 gm. mice of 0·25 ml. It was given orally to very young rabbits (8–12 days old) after preliminary short period starvation and gastric lavage. 16 out of 20 of the animals developed diarrhoea in 9–12 hours and death occurred in 12–24 hours. The post-mortem appearances were said to resemble those seen in human beings dying of cholera and the large gut was distended with fluid containing much desquamated mucous membrane in the form of shreds. It is emphasized that stool cultures from the animals did not show the presence of *Vibrio cholerae*. [If the toxic extract was prepared according to the method described by Gallut there would be no reason to expect the survival of any cholera vibrios. Indeed Gallut states that he finally sterilized his extract by shaking with toluene in the unlikely event of any vibrios surviving his treatment, but essentially it was an autolysate from the dead vibrios.] [See also *ibid.*, 1955, v. 52, 974.]

H. J. Bensted

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

BUONOMINI, G., RICCIARDI, M. L., BRACCINI, L. & CARLI, G. Rilievi sulla diffusione dell'amebiasi nella zona di Pisa. [**Observations on the Incidence of Amoebiasis in the Pisa Area**] *Giorn. di Malattie Infettive e Parassit.* 1959, Sept., v. 11, No. 9, 747–55. [31 refs.]

The English summary appended to the paper is as follows:—

"The authors describe the incidence of Amoebiasis among the inhabitants of Pisa and surroundings. 5732 subjects were examined during the period 1949–1957; 1625 of these subjects were sent to the Institute by physicians for diagnostic purpose and 4107 were screened among different classes of apparently healthy people. The incidence of *Entamoeba histolytica* infections was found particularly high during the years following the second war, it varied between

16·9% and 42·8% of subjects with clear clinical symptoms. During the period 1952–57 the average incidence was 3% among the healthy population chosen by chance and 8% in subjects sent by physicians. The authors emphasize that among special classes, such as foodhandlers, workmen, employers, the rate of amoebiasis is particularly high (14·7%, 22%, 12·9% respectively). During this inquiry it was also found that in 47% of population the infections by intestinal protozoa are present."

[See this *Bulletin*, 1959, v. 56, 569.]

McDade, J. J. & Shaffer, J. G. **Studies on the Growth Requirements of** *Entamoeba histolytica.* **VI. A Modification of the S–F Technic which makes possible the Utilization of Peptones other than Trypticase.** *Amer. J. Trop. Med. & Hyg.* 1959, Sept., v. 8, No. 5, 540–45, 6 figs.

Further studies on the S–F (Shaffer–Frye) medium [this *Bulletin*, 1948, v. 45, 786] have already been made by the original author [*Ann. New York Acad. Sci.*, 1953, v. 56, 1033; this *Bulletin*, 1955, v. 52, 692] to determine the nature of the factors responsible for multiplication of *Entamoeba histolytica.* The present authors have used a cysteine-peptone-glucose or maltose supernatant fluid with addition of yeast extract and sodium phosphate in presence of a single bacterial species. The bacterium was allowed to grow for 24 hours at 37°C. in this medium and after centrifuging 2·5 ml. of it was added to 0·1 ml. horse serum and 1,000 units penicillin G in 0·7 ml. saline followed by adjustment to *p*H 6·2. The tubes were then inoculated with *E. histolytica* and covered with paraffin. Serial transplants have been kept thus for 6 months. Other peptones were also tried in place of the Trypticase used in the original medium.

The bacteria were rapidly killed by the penicillin and the peak of growth was attained after 72 hours' incubation. The harmful influence of aeration on these cultures previously noted was verified, and this was due possibly to the presence of a reversibly oxidized substance. Although maltose was beneficial in the culture this sugar was not affected by the bacteria and the results suggest that the amoebae themselves can break it down. The present modifications of the S–F medium have proved satisfactory, probably because of the greater number of bacteria initially present but which are more easily killed in the modified medium. *J. D. Fulton*

Yang, W. C. T. **Effects of Several Metabolic Inhibitors on the Survival and Growth of** *Entamoeba histolytica.* *Amer. J. Trop. Med. & Hyg.* 1959, Sept., v. 8, No. 5, 575–9. [21 refs.]

It has not so far been possible to maintain *Entamoeba histolytica* in axenic cultures on defined medium and studies on the metabolism of the organism have therefore been beset by difficulties. In a further approach to the problem the present author has employed certain metabolic inhibitors whose site of action is known. Those employed were iodoacetate and fluoride which affect glycolysis, also cyanide and azide which interfere with electron transport and inhibit cytochrome oxidase. Fluoroacetate, which affects reactions in the tricarboxylic cycle, was also used, and finally arsenite which inhibits –SH

groups, and also arsenate which is thought to inhibit formation of high-energy phosphate bonds. The egg infusion medium of BALAMUTH and SANDZA [this *Bulletin*, 1945, v. 42, 999] was used for culture of *E. histolytica* in presence of a mixed bacterial flora. Pooled sediments containing known numbers of amoebae were added to the culture tubes containing the desired concentration of inhibitors. Examination for survival of amoebae was made after intervals of 24 or 48 hours. The results are summarized in tables. It was found that iodoacetate, arsenite and arsenate affected survival and growth of *E. histolytica*. The other substances used did not appear to affect growth.

[In view of the presence of a mixed bacterial flora in culture it does not appear that experiments of this kind could furnish any information of value about *E. histolytica*.] *J. D. Fulton*

BROOKE, M. M., MASON, R. & HARDY, A. V. **A Form for recording Sigmoidoscopic Examinations of Dysentery Cases.** *U.S. Armed Forces Med. J.* 1959, Oct., v. 10, No. 10, 1174–84, 2 figs. [13 refs.]

To save time in writing, a printed record form of sigmoidoscopic examinations was compiled for use in Korea. The findings were entered by an attendant during the examination; to ensure objectivity the operator completed this report before referring to the case history. The method greatly helped in the 4,000 examinations of prisoners of war on Koje Island, where from 30 to 100 were sigmoidoscoped daily. Subsequent comparison of findings was facilitated. *A. R. D. Adams*

EISERT, J., HANNIBAL, J. E., Jr. & SANDERS, S. L. **Fatal Amebiasis complicating Corticosteroid Management of Pemphigus Vulgaris.** *New England J. of Med.* 1959, Oct. 22, v. 261, No. 17, 843–5, 2 figs. [15 refs.]

"A case of fatal amebiasis developing during the course of corticosteroid therapy for pemphigus vulgaris is presented. The presence of latent amebiasis and its possible activation through the administration of corticosteroids should be considered when one is confronted with unexplained diarrhea in a patient treated with these agents."

BURNSIDE, W. W., Jr. & CUMMINS, S. D. **Amebic Abscess of the Liver in a Six-Month-Old Infant.** *J. Pediatrics.* St. Louis. 1959, Oct., v. 55, No. 4, 516–20, 4 figs.

"A case of amebic abscess of the liver in a 6-month-old Negro male is presented. The condition is rare in infants and we believe this child to be one of the youngest such patients on record."

[See this *Bulletin*, 1956, v. 53, 56.]

NEGHME, A., SILVA, R., GALDAMES, Marina & DOREN, Gabriela. Ensayo de terapéutica antiparasitaria en masa, de un grupo de asiladas del Hospital Psiquiátrico de Santiago. [**Mass Antiparasitic Treatment in a Group of Inmates of the Psychiatric Hospital at Santiago**] *Bol. Chileno de Parasit.* 1959, July–Sept., v. 14, No. 3, 46–51.

The English summary appended to the paper is as follows:—

"A brief coprological survey conducted at one of the sections of the

Psychiatric Hospital at Santiago yielded 33% of positive cases of *Entamoeba histolytica* infection among 100 women patients. The infected group was treated with Enterovioform (5-chloro-8-hydroxy-7-iodoquinoline with Sapanine) and Diodoquin (5-7-diodo-8-hydroxyquinoline). Coprological controls were performed at one week, 30 days and 90 days after treatment. Whereas the first tests revealed a marked decrease of infections, a few months later *E. histolytica* cysts appeared again in the faeces of 19 patients.

" Five months later a new survey was conducted among 217 women patients of that section out of which 66 were selected for anthelmintic treatment. This time, Dithiazanine Iodide (3-3′ diethylcarbocianine) was given for ten days in daily doses of 600 mg. The results were tested at 10, 40 and 48 days after treatment. Again, the number of patients infected with *Ascaris lumbricoides*, *Trichocephalus trichiurus* and *Hymenolepis nana* decreased at the beginning, but promptly new cases of infection began to appear in the treated group.

" The authors discuss the results of this therapeutic assay among individuals living in poor sanitary conditions and who, due to their mental state, are unable to follow sound advice with regard to their personal hygiene."

YOUNES, A. S. **Report on the Use of 5,6-Quinone-4,7-Phenanthroline in the Treatment of 81 Cases of Chronic Amoebiasis.** *J. Egyptian Med. Ass.* 1958, v. 41, Nos. 11/12, 546–52.

" a) 5,6-quinone-4,7-phenanthroline a new amoebacide, has been used to treat 76 cases of chronic intestinal amoebiasis, 1 case of acute amoebic dysentery and 4 symptomless cyst carriers.

" b) The usual dose we have used was 400 mg. daily for adults for 10 days, prolonged to 14 days when necessary.

" c) The effect of the drug in eliminating both cystic and vegetative forms is very good and the control of subjective symptoms rapid and highly satisfactory.

" d) Side effects are minimal and were of no consequence in the cases investigated."

[See this *Bulletin*, 1959, v. 56, 833.]

PEZZULLO, C., TEDESCHI, G. & BRANCACCIO, G. Rilievi istopatologici ed ematologici nella intossicazione sperimentale con un nuovo preparato antiamebico: la 5,6 chinone-4,7-fenantrolina. [**Blood and other Tissue Changes in Experimental Poisoning with a New Anti-Amoebic Preparation: 5,6 Quinone-4,7 Phenanthroline (Ciba 11925C, Entobex)**] *Acta Med. Italica.* 1958, Oct., v. 13, No. 10, 276–80, 18 figs.

For their experiment the authors chose 16 rabbits of 3 kgm. average weight; breeding, feeding and environmental conditions were uniform for all the animals. The tablets were given in daily doses of 25 mgm. to 4 animals, 100 mgm. to 4 others, 200 mgm. to 4 more and the remaining group of 4 was observed as a control. In no case did death supervene spontaneously but 2 rabbits from each treated group were killed after 30 days and the remaining 2 from each of these groups were killed after 70 days. Each rabbit was examined before treatment and every 8 days thereafter, and at post mortem the heart, lungs, liver, spleen, kidneys and adrenals were studied by histological section.

The authors report and illustrate their findings and conclude that when given the equivalent of double the dose recommended for human beings the rabbits showed no marked changes in the blood or other tissues even after the longer period of administration. Massive doses, equivalent to 4 and 8 times the human dose, did not prove fatal but produced serious changes in the laboratory animal.

Any cases of intolerance which may be encountered in human patients must be due to individual susceptibility and not to any toxicity of the drug.

J. Cauchi

CORTNER, J. A. **Giardiasis, a Cause of Celiac Syndrome.** *J. Dis. Children.* Chicago. 1959, Sept., v. 98, No. 3, 311–16, 1 fig. [23 refs.]

The prevalence of *Giardia intestinalis* varies in different areas of the United States. In most parts it exceeds 3% and in many areas in the south it rises as high as 20%. It is the low prevalence of symptoms which it evokes that has caused many parasitologists to doubt its pathogenicity.

Two theories of the pathogenesis of jaundice in giardiasis are advanced: (i) obstruction of the bile ducts, or (ii) irritation or oedema of the ampulla of Vater.

It is known that *Giardia* lives in optimum environment of *p*H 6·38–7·02, which the duodenum and upper jejunum supply. Both clinical and pathological evidence demonstrates that the trophozoites attach themselves to the mucosal surfaces by their peristomes. Their bodies and flagella are in constant motion since they feed primarily by absorption. It would seem logical, then, to assume that mild infections could produce upper gastrointestinal symptoms and that severer infections could bring about upper gastrointestinal malabsorption.

In a number of papers there have been reports of a coeliac-like disease due to giardiasis and these have been reviewed in this *Bulletin* [MILLER, this *Bulletin*, 1926, v. 23, 679; VÉGHELYI, *ibid.*, 1940, v. 37, 375, 376]. The most striking example which ended fatally and was fully studied at autopsy was reported by MCGRATH *et al.* (*Irish J. Med. Sci.*, 1940, v. 68, 802). The symptoms and signs in this notable case were typical of non-tropical sprue.

4 similar cases are now reported in detail here. The patients were children aged 10 months, 19 months, 22 months and 3 years; 1 girl and 3 boys. From the clinical angle and from their histories it would have been justifiable to regard and treat them as cases of coeliac disease, except that in one instance the symptoms and diarrhoea were *aggravated* by a gluten-free dietary. Free forms of *Giardia* were present in the duodenal aspirate in 3 patients and as cysts in the faeces in all. In the child aged 10 months on admission, *Giardia* was not found until he was 4 years old. One European boy aged 19 months had undergone tracheotomy for a "collapsing trachea".

These 4 cases were then associated with a coeliac-like malabsorptive disease. All were treated with quinacrine [mepacrine] 50 mgm. 2 to 3 times daily for 5 days. It eliminated the infection rapidly and relieved all resulting symptoms. Malabsorption of fat, similar to that found in coeliac disease was demonstrated in all. [Certainly the photographs illustrating this paper, showing the patients with protuberant abdomen and everted umbilicus, give a graphic representation of coeliac disease.]

Philip Manson-Bahr

ORREGO, F., FAIGUENBAUM, J. & APABLAZA, Adriana. Hallazgo de *Isospora belli* en jugo duodenal. [**A Case of *Isospora belli* found in the Duodenal Juice**] *Bol. Chileno de Parasit.* 1959, July–Sept., v. 14, No. 3, 55–6.

The English summary appended to the paper is as follows:—

"The authors report a human case of coccidiosis caused by *Isospora belli*, in which the oocysts were found not only in the faeces, but in the duodenal juice as well. They point out the possibility—already suggested by Elsdon-Dew *et al.* [this *Bulletin*, 1953, v. 50, 417]—that the common habitat of *Isospora belli* might be the duodenum or the biliary tract."

RELAPSING FEVER AND OTHER SPIROCHAETOSES

GALLIARD, H., LAPIERRE, J. & ROUSSET, J. J. Comportement spécifique de différentes espèces de *Borrelia* au cours de l'infection mixte avec *Trypanosoma brucei*. Son utilisation comme test d'identification des spirochètes récurrents. [**The Specific Behaviour of Different Species of *Borrelia* in the Course of Mixed Infection with *Trypanosoma brucei*. Its Use as a Method of identifying Relapsing Fever Spirochaetes**] *Ann. Parasit. Humaine et Comparée.* 1958, v. 33, No. 3, 177–208, 25 charts. [18 refs.]

This is an extended account, illustrated by a series of curves and tables, of results previously recorded [this *Bulletin*, 1958, v. 55, 768]. *Edward Hindle*

ZHORDANIYA-RAPAVA, T. K. [**On the Natural Foci of Caucasian Tick-Borne Relapsing Fever in Georgia**] *Zool. Zh.* Moscow. 1957, v. 36, Pt. 4, 622–5. [In Russian.] English summary. [Summary taken from *Rev. Applied Entom.* Ser. B. 1959, Oct., v. 47, Pt. 10, 147.]

In investigations in Georgia in 1949–54, relapsing-fever spirochaetes were found in jackals (*Thos aureus*) in hilly-mountain and hilly-steppe districts and in a reptile, *Agama caucasica*, in rocky areas, ravines and ruined buildings. They were also found in examples of *Ornithodoros verrucosus* Olen., Zas & Fen. associated with these animals and with foxes (*Vulpes vulpes alpherakyi*) and occasionally in those associated with badgers (*Meles meles minor*).

PAVLOVSKII, E. N. & SKRYNNIK, A. N. [**The Effect of Ultraviolet Rays on Ticks, *Ornithodorus papillipes*, infected with the Spirochaetes of Relapsing Fever**] *Zool. Zh.* Moscow. 1957, v. 36, Pt. 11, 1673–82, 1 pl. & 2 figs. [21 refs.] [In Russian.] English summary. [Summary taken from *Rev. Applied Entom.* Ser. B. 1959, Oct., v. 47, Pt. 10, 148.]

Details are given of experiments in which larvae, nymphs and adults of *Ornithodorus tholozani* (Lab. & Mégn.) (*papillipes* (Bir.)) infected with relapsing-fever spirochaetes were exposed to ultraviolet rays from a bactericidal lamp. The treatment had various effects on the ticks, killing some and causing malformations, usually of the legs, after moulting in others, but none on the spirochaetes in them.

WALTON, G. A. **A Biological Variant of** *Ornithodoros moubata* **Murray (Ixodoidea: Argasidae) from South Africa.** *Proc. Roy. Entom. Soc. of London.* Ser. A. 1959, Aug. 19, v. 34, Pts. 4/6, 63–72, 3 figs.

Colonies of *Ornithodorus moubata* originating from South West Africa, Bechuanaland, Transvaal and Angola have been compared with other strains of this species from East Africa [this *Bulletin*, 1958, v. 55, 510, 895]. The South African strain is domestic, living in African huts, but is smaller and paler than all the East African forms, and has a shorter life cycle, reaching maturity after 3 to 4 nymphal stages in the male and usually 4 nymphal stages in the female. During feeding the race from South Africa assumes a semi-spherical, tightly distended shape, similar to that of the East African form from animal burrows, and also produces coxal fluid later than the comparable East African domestic forms. The larva emerges from the egg before becoming quiescent, whereas the East African forms remain inactive and moult inside the egg.

This small race of *O. moubata* is more resistant to desiccation than the other forms and also has rarely been found infected with *Spirochaeta duttoni* [*ibid.*, 1958, v. 55, 1228]. *B. R. Laurence*

ZUMPT, F. **Is the Multimammate Rat a Natural Reservoir of** *Borrelia duttoni?* *Nature.* 1959, Sept. 12, v. 184, 793–4, 2 figs.

A strain of *Spirochaeta duttoni* was isolated from *Ornithodorus moubata* collected in a hut in Maun, Bechuanaland, inhabited by an African suffering from an acute attack of relapsing fever. This strain has been used for a number of experiments and the present article contains a comparison of the course of the infection in the white mouse and the indigenous multimammate rat, *Rattus natalensis* or *Mastomys coucha.*

In the white mouse spirochaetes appeared in the blood after an incubation period of 8 days, reached a maximum on the following day and persisted in diminishing numbers with occasional negative periods for another 18 days. The multimammate rat, on the other hand, showed spirochaetes on the 7th day and the infection reached a maximum on the 14th day and large numbers of organisms persisted in the blood up to the 25th day. After a negative period of 2 days the blood again became positive, reaching a maximum on the 31st day of the infection but without producing any obvious clinical symptoms. The result suggests that the multimammate rat may be a better experimental animal for investigations on relapsing fever than the white mouse, but it should be noted that the mouse was infected by injecting infected eggs of *Ornithodorus moubata*, and the rat by injecting brain emulsion from a white mouse.

The author also discusses the epidemiology of the disease. *O. moubata* is commonly found in the burrows of warthogs, but the ticks are never infected with *S. duttoni*, and moreover the warthog is refractory to this infection [this *Bulletin*, 1956, v. 53, 196]. On the other hand the multimammate rat has been found to be highly susceptible and in the African villages lives in close contact with man. *Edward Hindle*

YAWS AND OTHER TREPONEMATOSES

PRATES, M. **Epidemiology of Yaws in the Province of Mozambique.** *Anais Inst. Med. Trop.* Lisbon. 1958, June, v. 15, No. 2, 359–82, 9 charts [8 (2 coloured) folding]. [16 refs.]

This epidemiological study is based on the distribution of yaws patients voluntarily reporting for treatment, because no specific survey has yet been made. The numbers are probably no indication of what the survey will reveal because the people of Mozambique regard the disease as venereal and therefore shameful. The geography and climate of the territory are described and illustrated in maps showing also the distribution and prevalence of yaws. The incidence of yaws declines with increasing distance from the coast and is noticeably low at high altitudes. It is associated with higher temperatures, except in one area, and with the megathermic type of climate, *i.e.*, temperatures never below 21°C., and "potential evatotranspiration . . . greater than 1:140 mm". There is no direct correlation with precipitation but there is with humidity. Yaws incidence is highest in the socially and economically retarded communities.

Transmission is believed to be due to direct contact, including sexual intercourse, but biting insects, particularly bed-bugs, may play a part. Primary lesions are most often seen in children and women, and no infections have been noted in Europeans. Syphilis incidence is about half as high as that of yaws in the same regions, a finding at variance with that of most authorities. In 1950 over 64,000 cases were treated. In 1952 a yaws campaign was organized which cost £9,000 and after one year reduced the number of cases treated by 15,000. The author makes a plea for a specialized yaws service and an eradication campaign. *T. H. Davey*

ENGELHARDT, H. K. **A Study of Yaws (Does Congenital Yaws Occur?).** *J. Trop. Med. & Hyg.* 1959, Oct., v. 62, No. 10, 238–40, 1 map and 2 figs.

The author carried out the study here reported in a remote jungle area of central Java in 1955. Despite the fact that a treponematoses control programme, sponsored by WHO, had been in operation over this area since 1950, a high incidence of infection was found.

The diagnosis was made on the clinical recognition of skin, bone and joint lesions, and on the result of a complement-fixation test, with a cardiolipin antigen, on the serum. "In doubtful cases the diagnosis was confirmed by cerebrospinal fluid examination." [The abstracter concludes that when the distinction from syphilis was clinically difficult, negative reactions in the cerebrospinal fluid pointed to yaws and excluded syphilis. This seems a facile deduction. No mention is made of the incidence of undoubted syphilitic lesions in the population studied.]

Yaws was diagnosed in 814 pregnant women, 152 of whom showed "crab yaws", 500 were in a state of latent yaws and 162 showed destructive lesions. [The lesions so named are not described or illustrated, nor is it stated how latent yaws was distinguished from latent syphilis, or on what grounds the destructive lesions were attributed to the former disease.]

The babies born to these women were examined within 2 hours of birth, and were re-examined and subjected to blood tests 4 times during the next 5 months.

The serological and clinical findings relating to this series of infants are reported in a somewhat confusing manner. It would seem that 60–70% of the infants born to infected mothers showed "crab yaws" and positive sero-reactions, from 7–20% showed positive sero-reactions only, and the rest were considered free from infection on both clinical and serological grounds. The highest proportion of healthy infants (25%) was born of those infected mothers who showed "crab yaws".

Treatment of the mothers in the past, by 1, 2 or 3 injections of neosalvarsan, or 6 ml. of PAM (penicillin aluminium monostearate), strikingly reduced the incidence of sero-positive infants born to them. Of the infants of untreated mothers only 10% were sero-negative, but of those borne by mothers treated with PAM, 50% were free from infection.

An additional finding of great significance was that destructive bone and joint lesions were observed in 125 children who were only 1–3 years old.

[It seems a pity that this important study has not been reported in greater detail. On the evidence presented, a strong, though not completely convincing, case for the existence of congenital yaws has been stated. A further bald though intriguing statement made is that "many cases of congenital malaria were observed in this area". One hopes for a further report on this subject.]

J. H. Walters

GHOSH, R. & GHOSH, S. **A Review of Literature on Pinta—a Non-Venereal Treponematosis: with a Note on the Study of the Disease in Bengal.** *J. Indian Med. Ass.* 1959, July 16, v. 33, No. 2, 50–55. [28 refs.]

6 cases are reported in 1956 and 5 in 1957.

LEPROSY

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

GRAMBERG, K. P. C. A. **Leprosy and the Bible.** *Trop. & Geograph. Med.* Amsterdam. 1959, June, v. 11, No. 2, 127–39. [20 refs.]

This paper is another plea to replace the name "leprosy" by some other, and thus get rid of all the false ideas that the word conjures up in the popular imagination. There can be no doubt that whatever concept the word *zara'th* may have conveyed to the ancient Hebrew mind, the morbid conditions described in the Book of Leviticus under this name were not what is called leprosy today; yet the fears aroused by *zara'th*, and the harsh treatment of the "unclean" sufferers in Old Testament times, still continue to distort the

general attitude towards a wholly different disease. [It might be well to remind readers how this unhappy confusion of terms arose and, for the sake of clarity, true leprosy will be called for the moment "Hansen's disease". The Greeks were familiar with this and named it "elephantiasis"—because of the thickening and corrugations of the skin—but never "lepra" (*leprós*, scaly), a term they limited to scaling diseases of the skin, like psoriasis. By a lamentable error on the part of early writers, "lepra" was transferred to Hansen's disease, and became the standard medical term for this; but it also embraced a conglomeration of loathsome diseases which give rise to scales, scabs, ulcers, tumours and mutilations. Further, "leprosy" was extended to include mange and scab of animals, and rotting diseases of crops. In this welter of confusion even the word "elephantiasis" lost its original exact meaning, and came to be applied to conditions such as "universale manginesse" of horses. The common religious practice of branding moral depravity as leprosy of the soul, intensified the feelings of repulsion which the term aroused, and are now ineradicably bound up with it. On the other hand, the word could mean mere weakness or infirmity, and, for example, Latin terms for such states are rendered by "leprosy" in the Old Celtic translations in the Wurtzburg Glosses.

When the translators of the Bible rendered *zara'th* by "lepra", it seems likely to the reviewer that they did not take Moses's word as referring to Greek elephantiasis, but employed lepra rather in the general sense of "affliction", in the same way as St. Jerome in writing the Vulgate, used the adjective *leprosus* to mean "stricken", and as Wycliff, a thousand years later, used the English word "leprous".]

Dr. Gramberg explains that the inspiration of his paper was not historical study, but the misery of the leprosy patient, his loneliness, and the despair (which can drive him to suicide), as he witnessed year in and year out when in charge of a leprosy sanatorium in Indonesia. His moving arguments in favour of a change of name are summed up in a quotation from a patient: "Why does the medical world—which has the power to change my ill-fated lot by one, small word—refuse to free my disease from its stigma, the biblical name leprosy . . . ?" Dr. Gramberg points out that "Hansen's disease" is not a scientifically acceptable name, and suggests "leontiasis" instead—which, by the way, has been known in English for more than two centuries.

W. P. MacArthur

BARUFFA, G. Considerazioni sulla endemia di lebbra in Somalia [**A Study of Endemic Leprosy in Somaliland**] *Ann. Soc. Med. Igiene Trop. Somalia.* 1954–8, v. 2, 13–23. [13 refs.] English summary.

The author refers to the 259 leprosy patients in the Alessandra Leprosarium in Italian Somaliland. Of these 201 are lepromatous and 58 tuberculoid; and there are only 22 patients under 15 years of age. From this high type rate and low child rate he argues that the disease is receding, and is likely soon to die out. [No mention is made of the method used for registering patients or of finding out how many patients there are outside the leprosarium, or what types are represented.] Most of the patients are Negroid and come from the valleys of the 2 principal rivers.

Ernest Muir

SHARMA, V. K. **Leprosy in the Rural Areas of Kanpur District. Its Relationship with the Tuberculin Positivity Rates in the Local Population.** *Internat. J. Leprosy.* Wash. 1959, Apr.–June, v. 27, No. 2, 141–7. [13 refs.]

The interest of this paper is in the question of cross immunity between tuberculosis and leprosy. The district headquarters of Kanpur in Uttar Pradesh, India, has a population of 7 millions, while the population of the District is over 12 millions. Examination of 5,334 people showed 158 leprosy cases of which 27 were of the lepromatous type. In the 2 subdivisions where leprosy was most prevalent (40·5 per 1,000), the lepromatous cases constituted one-fifth of the total. In another subdivision where there were only 13·5 per 1,000 only 4 out of the 29 cases found were lepromatous. In the former two subdivisions the tuberculin positivity was lower than in the latter (31·8 compared with 39·4), in the period up to 14 years of age.

Although the findings are not conclusive, it is suggested that there may be some connexion between the two findings, and that the higher incidence of leprosy in those aged less than 14 years may be at least partly due to the lower incidence of tuberculosis. *Ernest Muir*

CARRANZA AMAYA, A. **Epidemiologic Study of Leprosy in the Republic of El Salvador, Central America.** *Internat. J. Leprosy.* Wash. 1959, Apr.–June, v. 27, No. 2, 116–23, 1 fig.

The Republic of El Salvador has a population of 2,434,430, of which a quarter of a million are in the capital, San Salvador. Since 1943 153 cases of leprosy have been found, originating in 41 foci in 10 of the 14 political divisions of the country. The Chalatenango Department furnished 81 cases, giving an index of 59·0 per 100,000. The type distribution was: lepromatous 54·3%, tuberculoid 17·6%, indeterminate 28·1%.

It is calculated that there are 300 more patients undiagnosed, and recommended that an anti-leprosy campaign should be established. *Ernest Muir*

BROWN, J. A. K. & REES, R. J. W. **A Simple Apparatus for the Transport of Leprosy Tissue on Ice.** *East African Med. J.* 1959, Sept., v. 36, No. 9, 495–9, 2 pls.

Tissues are placed in sterile screw-cap glass bottles which are fitted into a screw-cap plastic cartridge. This again is placed in a 1-pint domestic vacuum flask which is filled with 195 gm. ice, and water is added to fill up the crevices between the pieces of ice. Only the inner glass part of the flask is used, and this is placed in a water-tight plastic bag, closed at the top with a metal clip. The flask is closed with a cork which is strapped on, and which is perforated by a fine metal tube to allow for changes in atmospheric pressure. The flask in the plastic bag is placed in a canvas bag which is suspended inside a crate. Arrangements are made for renewal of ice, if necessary, during the journey by car and air from the laboratory in Uganda to that in London. The tissues are generally obtained from patients with lepromatous type leprosy, stringent aseptic precautions being taken.

The apparatus is illustrated by two plates. *Ernest Muir*

BRIEGER, E. M., with the assistance of Elizabeth M. CRAWFORD. **The Fine Structure of the Lepra Cell.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1959, July, v. 53, No. 4, 346–8, 7 figs. on 4 pls.

In the author's opinion the term "lepra cell" should be reserved for the cell-parasite relationship which results in the disintegration of the ingested bacillus and of the cytoplasm of the host cell. A different term should be reserved for the macrophage in which the ingested bacillus multiplies and bursts the cell.

A description is given of the appearance of lepra bacilli in electron micrograms of thin sections of lepromatous nodules fixed in Susa solution. The nuclei of the cells were found to be well preserved, but the cytoplasm was largely replaced by "peculiar cytoplasmic inclusions". Normal mitochondria were present. Some of the inclusions consisted of vacuoles of various sizes with well-defined membranes and embedded in a strongly osmiophilic and granular matrix. Some of these vacuoles were empty, but others appeared to contain cross-sections of bacilli or parts of disintegrating bacilli. Intact longitudinal sections of bacilli were sometimes found in the cytoplasm of a cell having inclusions: these forms of bacilli were rarely found in the inclusions.

In contrast to the lepra cell development were cells which had more recently ingested bacilli which were shown in cigar-shaped bundles. The cell nuclei were swollen or there was only the nuclear membrane remaining. "In longitudinal section the bacilli are seen to be of filamentous type and to have a uniform coarsely granular cytoplasm with no definite sign of internal organization."

[For a previous study, see this *Bulletin*, 1956, v. 53, 1432.] *Ernest Muir*

ISHIHARA, S. **Giant Cells and Inclusion Bodies in the Leprous Skin Lesions.** *Internat. J. Leprosy.* Wash. 1959, Apr.–June, v. 27, No. 2, 124–8, 6 figs.

The author describes two kinds of giant cells in leprosy lesions: the Langhans type in tuberculoid leprosy, appearing in the active but not the recessive stage; the foreign body or Touton type in lepromatous cases, appearing in the reactional phase, and composed largely of spindle-shaped histiocytes which tend to fuse together to form these giant cells. Giant cells were found in 22 out of 180 lepromatous cases and in 22 specimens from 28 active progressive tuberculoid cases.

In sarcoidosis, inclusion bodies of 2 kinds have been found: the Schaumann type, round and double-contoured and laminated in giant cells, and asteroid bodies in the giant cells. The author has found only the asteroid form in leprosy, and only in the giant cells in the lepromatous type. Sometimes there may be more than one asteroid inclusion body in a giant cell. *Ernest Muir*

ROSS, Hilary, BUTLER, C. F. & LAUKAITIS, R. B. **C-Reactive Proteins in the Sera of Patients with Leprosy.** *Internat. J. Leprosy.* Wash. 1959, Apr.–June, v. 27, No. 2, 129–33.

The appearance of C-reactive protein (CRP) in human serum may have very broad clinical significance, and is a nonspecific indicator of an inflammatory reaction, bacterial or nonbacterial in origin.

The authors determined the CRP in 335 lepromatous and 45 tuberculoid cases of leprosy. The results are given in tabular form. Over a period of 2 years 2,140 tests were performed. Of the tuberculoid cases 20% were consistently positive, 37·8% inconsistently positive, and 42·2% consistently negative. Of 55 "arrested" lepromatous cases 50·9% were consistently negative, 30·9% inconsistently positive, and 18·1% consistently positive. Of 280 bacteriologically positive lepromatous cases 34·2% were consistently negative, 43·2% inconsistently positive, and 22·5% consistently positive. "From our study . . . failure to develop CRP in active lepromatous cases may have a favorable prognostic significance." *Ernest Muir*

BONATTI, A. A. & LEBRÓN, E. J. Fraccionamiento electroforético en suero de leprosos. [**Electrophoresis on the Sera of Leprosy Patients**] *Rev. Facul. Med. de Tucumán.* 1958, July, v. 1, Nos. 1/2, 143–9, 1 fig. [11 refs.]

The English summary appended to the paper is as follows:—

"The authors have performed the method of electrophoresis on paper, in the serum of 67 individuals afflicted with leprosy; in 38 cases of nodular leprosy there is a marked increase of gamma-globulin; in the cases of tuberculoid leprosy the electrophoretic curves are normal, with only a few exceptions; in persons suffering from indetermined and border line leprosy, the gamma-globulin values are slightly higher. The other globulinic fractions are absent or scarcely altered. The percentage of albumin values is relatively decreased. The authors maintain leprosy causes a dysproteinemia with hypergamma-globulinemia produced by the infection itself."

BROWN, J. A. K. **The Multipuncture Depot Lepromin Test: Investigations with Different Antigens.** *Leprosy Review.* 1959, Oct., v. 30, No. 4, 215–19, 1 fig. on pl.

This paper is in sequence to previous work by the author on a depot lepromin test and BCG vaccination [see this *Bulletin*, 1959, v. 56, 1037]. In the earlier paper the antigen used was taken from lepromatous leprosy, in this other antigens are used.

Two experiments are described. In the first an antigen made from tuberculoid skin was used in 25 patients who were positive to ordinary lepromin, application being made by the "depot" (multipuncture) method. Of these, 7 were slightly positive, 1 was moderately positive and the rest were negative.

In the second experiment 56 non-leprous children were divided into groups A and B. In Group A 37 were tested simultaneously, by means of the depot method, with 1 in 20 antigens made up with depot medium made (i) from normal skin, (ii) from active tuberculoid tissue, (iii) from bacteriologically negative skin from a lepromatous patient, and (iv) standard lepromin. In Group B the antigens were applied to 19 children, and were the same as in Group A except that the antigens were made up with normal saline. All the children were positive to the normal lepromin except 9 in Group A; 3 of those tested with bacteriologically negative antigen were slightly positive, and those tested with the other 2 antigens were negative. After BCG vaccination the depots of 3 negatives showed conversion and 6 showed increased positivity.

It is concluded that when the depot method of lepromin testing is used, antigens other than those containing lepra bacilli do not give positive results such as those produced when the antigen is injected. BCG had no effect on any of the depots except those containing lepromin from bacteriologically positive lepromatous tissue, but after BCG all the subjects who were lepromin negative became positive, and the majority of those who were positive showed an increase in positivity. "The bacilli appear to be the important factor and BCG vaccination quickly alters the attitude of the host towards them in the majority of healthy individuals, a change which of course might take place later and more slowly by natural processes." *Ernest Muir*

Olmos Castro, N., Arcuri, P. B., Usandivaras, R. L., Bonatti, A. A., Lebron, E., Toranzos, L. B. & Conejos, M. **Hypersensitivity of Vaccination and of Infection due to** *Mycobacterium leprae* **(Preliminary Report).** *Internat. J. Leprosy.* Wash. 1959, Apr.–June, v. 27, No. 2, 148–56, 1 fig. [Translated from *Archivos Argentinos de Dermat.* 1958, v. 8, 221–9.]

It was found that when healthy persons were injected with lepromin they became hypersensitive to the leprosy bacillus. A second injection of lepromin, 21 days later, provoked a 48-hour inflammatory reaction of the tuberculin type, which became a nodule at the end of the first week. If at the same time as the second lepromin injection an injection of leprolin (a suspension of the total proteins but without bacillary bodies) be given, there is a local inflammatory reaction of the tuberculin type, which persists to the 4th day and disappears by the 7th day. Hypersensitive patients with tuberculoid leprosy respond to integral lepromin in the same way with a tuberculin-type reaction in 48 hours, but this generally forms a nodule by the 7th day.

The authors consider that the early reaction (of Fernandez) indicates a state of hypersensitivity to *Myco. leprae* and has the same value as the Mantoux reaction in tuberculosis, and that the Mitsuda or late reaction is the final stage of the inflammation of the tuberculin-type hypersensitivity. They hold that the early and late reactions are different stages of the same process. They consider that the phenomena of hypersensitivity should be studied separately from those of immunity, and that there are reasons for believing they are different states which obey different mechanisms. *Ernest Muir*

Carayon, A. & Languillon, J. Contre-vérités et paradoxes cliniques de la névrite hansénienne. [**Contradictions and Paradoxes in Leprous Neuritis**] *Méd. Trop.* Marseilles. 1959, Sept.–Oct., v. 19, No. 5, 537–41, 2 figs.

This paper is an account of certain paradoxical findings in the examination of 73 leprosy patients. In choosing these patients those with cutaneous lesions were eliminated. In 2 patients there was normal sensation although total ulnar motor power was wanting. In 3 there was the classical form of dissociation, that is loss of thermal sensation with retention of tactile sensation. In 11 there was exactly the reverse of this. In 57 patients there was loss of both kinds of sensation.

The first 2 cases mentioned are explained by the level at which the motor fibres leave the main nerve. The reversion of dissociation is explained by reference to the work of physiologists on the differing diameters and conduction speeds of various nerve fibres. When total anaethesia is present there may be complete sclerosis of the nerve. *Ernest Muir*

BROWNE, S. G. **The Clinical Course of Dimorphous Macular Leprosy in the Belgian Congo.** *Internat. J. Leprosy.* Wash. 1959, Apr.–June, v. 27, No. 2, 103–9, 4 figs.

This paper gives some very striking figures for leprosy in the Belgian Congo: "11·9 per cent. of the total population was under treatment for leprosy in 1957". [It is not quite clear if this is in the whole country or only in the Oriental Province.] In the above Province, 3·2% out of 5,349 patients under treatment have the dimorphous macular form, but 62 (10%) of those in the Yalisombo leprosarium in that province have this form. It is emphasized that such patients are often not recognized as open cases, as clinical appearance may resemble the tuberculoid form; and for this reason periodic examinations of 6 smears from all parts of the body should be made. In the last resort it is the concomitance of 2 or more "incompatibles" that suggests the diagnosis of dimorphous macular leprosy, especially the presence of well-defined regularly hypopigmented macules which are highly positive bacteriologically.

Detailed descriptions of the various forms of the lesions are given. At some time in 50 out of the 62 patients the primary lesion became highly positive bacteriologically, and at the same time the nasal mucosa, earlobes and other parts of skin became bacteriologically positive. "It is interesting to observe that in dimorphous macular cases material from the nasal mucosa gives positive bacteriologic results more frequently than material from the most active portion of the macule, or from the earlobe." In 42 of the 50 cases the nasal mucosa was the last site to become negative. *Pari passu* with the clinical changes, histological appearances changed at successive biopsies.

Ernest Muir

FURTADO, T. A. **The Lucio-Alvarado Form of Leprosy. A Case observed in Brazil.** *Internat. J. Leprosy.* Wash. 1959, Apr.–June, v. 27, No. 2, 110–15, 4 figs. [14 refs.]

"A case of 'pure and primary diffuse lepromatosis with multiple necrotizing vascularitis' (Lucio and Alvarado leprosy) is reported, the first to be recorded in Brazil. The outstanding reports on the subject are reviewed with respect to the most important morphologic and histopathologic aspects of this variety of the lepromatous type."

ARCURI, F., MONETA, G. & SANTUCCI, G. Osservazioni cliniche sull'apparato cardiovascolare nella lebbra. [**Clinical Observations on the Cardiovascular System in Leprosy**] *Acta Med. Italica.* 1958, Oct., v. 13, No. 10, 263–75, 6 figs. [27 refs.]

The authors have examined 58 inmates, selected at random, in the leprosy hospital of Liguria for evidence of cardiovascular disease and they summarize

their clinical findings for each patient in their paper. 25 were women and 33 men with an age range of 23 to 82 years. The type of disease was lepromatous in 52 and tuberculoid in 6. The investigation included personal history, ECG, radioscopy, venous blood pressure, circulation time and oscillography.

In only 7 (12%) of the patients was there any evidence of heart disease and in each of these there was past or present disease, other than leprosy, to account for the cardiovascular changes. The authors conclude that leprosy does not cause specific cardiological changes. The paper includes references to a good deal of literature and to the findings of various workers who claim to have found post mortem changes in the heart and blood-vessels of leprosy patients which were thought to be characteristic of the disease. *J. Cauchi*

LANGUILLON, J. & BOISSAN, R. Contribution à l'étude de l'aspect radiologique des lésions des extrémités osseuses chez le lépreux soudanais (Institut Marchoux—Bamako). [**Study of the Radiological Aspect of Bone Lesions of the Extremities in Sudanese Leprosy Patients**] *Méd. Trop.* Marseilles. 1959, Sept.–Oct., v. 19, No. 5, 558–67, 4 figs.

This paper is based upon a 10 months' study of 302 unselected leprosy patients at Bamako. Of these 56·9% were lepromatous, 35·8% tuberculoid, and 7·3% undifferentiated.

It was found that the majority of bone lesions affected the hands. There was total absence of disease in the sesamoid bones. There was lack of correlation between the diameter of the foramina and the degree of leprous affection of the extremities. Osteo-arthritis was relatively most frequent (50%) in the interphalangeal joints of the hands. Pen drawings are given of the various phalangeal lesions associated with osteolysis and osteoclasis. The most frequent lesion in upper or lower extremities was osteolysis at the ends of the digits. It was exceptional to find arthritis in claw-hand, only 1 case in 51.

Ernest Muir

PRICE, E. W. **Studies in Plantar Ulcers in Leprosy. IV. Etiology of Plantar Ulcers.** *Leprosy Review.* 1959, Oct., v. 30, No. 4, 242–8. [12 refs.]

This is the fourth of a series of studies on plantar ulcers in leprosy. [See, for example, this *Bulletin*, 1959, v. 56, 729, 1143.] The author mentions 5 theories of the cause of the ulcers: that they are specific lesions; that the autonomic nervous system is involved; that trauma is the prime cause; that plantar pressure is a cause; that clawing of the toes exposes the metatarsal heads. He considers that the 3 factors involved in the production of the plantar ulcer are: an anaesthetic foot, a walking foot, a foot with a damaged musculature. Weakness of this nature compromises the mechanism by which the points of rotation are protected from damage during walking. "Plantar ulcers will heal and remain healed if the walking roll is interrupted, either by bed rest, or by wearing a plaster cast, or by wearing footwear with a rigid sole." *Ernest Muir*

GOKHALE, B. B., VABLE, S. M. & MODAK, S. **Circulation in the Feet of Leprosy Patients, with and without Ulcers.** *Leprosy Review.* 1959, Oct., v. 30, No. 4, 234–41.

The object of this experiment was to determine whether pathological involvement or inherent inadequacies of the arterial system are responsible in part for ulceration of the feet in leprosy. Four groups were chosen: healthy persons, patients with positive serological tests for syphilis, leprosy patients without trophic ulcers of the feet, and leprosy patients with non-healing ulcers of the feet.

The temperature of mouth, lower third of legs and dorsa of the feet was registered before and after injection of 0·5% nupercaine as a spinal anaesthetic. Comparison showed that there was less difference in temperature before and after spinal anaesthesia in the ulcerated than there was in the non-ulcerated feet, but there was not this variation in the lower third of the same patients' legs. This may be due to pathological involvement of the arteries of the ulcerated feet, or it may be due to an inherent defect of the arterial circulation of the patients. *Ernest Muir*

CURRIE, G. **Short and Long Acting Sulphones by Intramuscular Injection.** *Leprosy Review.* 1959, Oct., v. 30, No. 4, 220–33, 2 figs. on pl. [22 refs.]

Using DDS (300 mgm. twice weekly by mouth) as a control, the author compared 3 methods of administering sulphones by injection. These were: (1) Avlosulfon Soluble, a 41% aqueous solution of acetaldehyde sodium bisulphite complex of DDS, of which 6 ml. (the equivalent of 1·2 gm. of DDS) was injected intramuscularly at fortnightly intervals; (2) DDS suspended in ethyl esters of hydnocarpus oil (1·25 gm. in 5 ml. with 4% guaiacol added), injected intramuscularly at fortnightly intervals; (3) Avlosulfon Aqueous Suspension, a 20% suspension of DDS in water with fine particles which make injection easy, and the retard effect is secured "by a novel agent which maintains dapsone in watery suspension". It was found that 0·6 gm. fortnightly, half the amount required with oral DDS, was sufficient to maintain the conventionally accepted blood level.

There is evidence that, although high blood level only lasts for 3 days out of the 14, the "hammer like" action of "regular irregularity" produces clinical improvement comparable with sustained blood concentrations. There was no significant difference in the results of the 4 groups. The aqueous suspension was considered the preparation of choice on the grounds of freedom from pain, absence of side effects, convenience of injection and economy of the total amount of sulphone used. It was not found that with these sulphones given parentally there were fewer lepra reactions and less erythema nodosum. *Ernest Muir*

GARROD, J. M. B. **Two Years Experience with Diphenylthiourea (DPT or CIBA 1906) in the Treatment of Leprosy.** *Leprosy Review.* 1959, Oct., v. 30, No. 4, 210–14.

The author tested the therapeutic effects of diphenylthiourea (DPT) on 40 leprosy patients who had sought in-patient treatment, and gives the results after

24 months; patients on the standard treatment with DDS served as controls. Improvement, based on Bacillary Index results and taking the initial average as 100, was 62·5 after 12 months, and 50 after 24 months; the corresponding figures for DDS were 100, 74 and 48.

There thus appeared to be quicker improvement to begin with, which slackened off later. The chief value of DPT is, however, in the comparative absence or mildness of lepra reaction or erythema nodosum, as is illustrated in the history of 6 cases. Also, toxic side effects are less common. From the point of view of economy also DPT may have an advantage, as with its use expensive in-patient treatment is less necessary owing to the rarity of reactions and side effects.

While DPT does not replace DDS as the drug of choice for mass treatment, it is of particular value when DDS is not tolerated well.

[See also INNES *et al.*, this *Bulletin*, 1957, v. 54, 1421; DAVEY, *ibid.*, 1958, v. 55, 524.] *Ernest Muir*

THANGARAJ, R. H. **Use of a Tension Equaliser in the Many Tailed Operation for Claw Hands.** *Leprosy Review.* 1959, Oct., v. 30, No. 4, 249–50, 2 figs.

MONTESTRUC, E., with the collaboration of D. GARCIN, R. BERDONNEAU & J. BENOIST. Endémicité lépreuse et vaccination par le B. C. G. de certaines categories d'enfants (contacts et non contacts) à la Martinique. [**Leprous Endemicity and Vaccination with BCG of some Categories of Children (Contacts and Non-Contacts) at Martinique**] *Internat. J. Leprosy.* Wash. 1959, Apr.–June, v. 27, No. 2, 97–102.

Since 1954 arrangements have been made in Martinique for the BCG vaccination of all children born of leprous parents, of all those in contact with leprosy who are less than 20 years old, and compulsorily of all schoolchildren at the age of 7. In the period from 1949 to 1953 the percentage of those under 15, out of all the leprosy patients registered, was 31·3; from 1954 to 1958 the percentage has fallen to 26·5. Since BCG vaccination was begun the lepromatous rate among those under 15 has shrunk from 32·5 to 14·3; in 1958 it was only 9·7%. On children up to 5 years old who have been registered, the number of leprosy cases has diminished from 6·6 to 1·6. This coincidence of BCG vaccination and diminished leprosy is significant, and ought to be underlined. *Ernest Muir*

MCFADZEAN, J. A. & VALENTINE, R. C. **The Value of Acridine Orange and of Electron Microscopy in determining the Viability of** *Mycobacterium leprae murium.* *Trans. Roy. Soc. Trop. Med. & Hyg.* 1959, Sept., v. 53, No. 5, 414–22, 4 figs.

STRUGGER (*Deut. Tierärztl. Woch.*, 1942, v. 50, 51) reported that living tubercle bacilli, stained with acridine orange, fluoresced green under UV light whereas dead ones fluoresced red. The present paper reports an attempt to use this dye for detecting the viability of *Mycobacterium lepraemurium.*

The organisms were derived from rat lepromata and killed by various

methods, *i.e.* heat, formaldehyde, Carnoy fixative, ethanol, UV irradiation, and by storage at 2°C. and 37°C., and films of them were then stained with 1:4,000 acridine orange at *p*H 7·4. Untreated and unstained bacilli fluoresced from nil to blue-green and when stained the majority still fluoresced blue-green with only an occasional one fluorescing red. All the stained dead bacilli also fluoresced blue-green except those killed by heating at 80°C., and these were red.

The bacilli that were stored at 2°C. and 37°C. were also examined by electron microscopy; those stored at 2°C. were almost all of uniform electron density but most of those kept at 37°C. were obviously degenerate for they were largely empty apart from dense masses of shrunken material; injection into rats confirmed that those kept at the higher temperature were dead and that those kept at 2°C. were viable.

The authors therefore conclude that use of the acridine dye does not enable dead and living bacilli to be distinguished except when the bacilli have been killed by heat. They thought that the red fluorescence of these bacilli might be due to a change in the permeability of the cell membrane, but this is apparently not the explanation for bacilli whose membranes had been ruptured in a Hughes press also failed to fluoresce.

An incidental observation was that the dye in red fluorescing bacilli or in solution changes to green when exposed to blue light and this phenomenon may explain certain anomalies in the literature concerning this dye.

S. R. M. Bushby

HELMINTHIASIS

In this section abstracts are arranged as far as possible in the following order:—TREMATODES (*schistosomes, other flukes*); CESTODES (*Diphyllobothrium, Taenia, Echinococcus, other cestodes*); NEMATODES (*Hookworms, Ascaris, Filarial worms, Dracunculus, etc., Trichuris, Enterobius, Trichinella, etc.*).

AGUILAR, F. J. **The Polyanthelmintic Action of Dithiazanine Iodide. Verification of its Effectiveness in the Most Common Helminthiases in Guatemala.** *Amer. J. Trop. Med. & Hyg.* 1959, May, v. 8, No. 3, 305–6. [12 refs.]

The author briefly summarizes results obtained by himself and others [for references, see this *Bulletin*, 1959, v. 56, 1039] in tests of the anthelmintic activity of dithiazanine iodide (Compound 01748, Lilly Research Laboratories), which has been found effective against ascariasis, trichuriasis, hookworm (*Necator americanus*), enterobiasis and strongyloidiasis in man and in infections with " hookworm ", *Trichuris, Ascaris* and " pinworm " in dogs, cats and mice. In this paper Aguilar gives results of his trial of a new form of dithiazanine iodide, *i.e.* CAP coated tablets supplied by Lilly Research Laboratories.

He treated 100 patients of both sexes aged 2 years 4 months to 53 years, none of whom had any special diet or other preparatory treatment. They were infected with *Ascaris, Trichuris, Enterobius, Strongyloides, Uncinaria* [?*Necator*], *Hymenolepis nana, H. diminuta* and *Taenia saginata*. Quantitative stool examinations were made before and after treatment by the Stoll technique.

The average doses given were: adults, 200 mgm. two or three times daily for 5 days, or, in some cases, for longer; children were given an exploratory dosage [not stated] according to weight.

Of the 100 patients treated 59 had infections with a single parasite [species not stated] and 41 had infections with two, three or four helminths [species not stated]. Of the total of 154 infections, 124 were due to nematodes and 30 to cestodes.

The "cure rate" with dithiazanine iodide was: 100% in enterobiasis and strongyloidiasis, 86·79% in ascariasis, 85·72% in trichuriasis, 61·53% in uncinariasis; and for *Hymenolepis nana*, which "has the greatest incidence in Guatemala", 80%. "The egg reduction after treatment" was: *Ascaris*, 97·99%, *Trichuris*, 93·13%, *Uncinaria*, 86·16%, *Hymenolepis nana*, 88·89%.

Patients with *Hymenolepis diminuta* and *Taenia saginata* were not considered cured, because "the presence of scolices could not be confirmed in the faeces by means of a sieve after treatment".

Of the 100 patients 9 had nausea and vomiting, but these were not severe enough to require interruption or cessation of the treatment. Less than 5% of the patients failed to complete the course of treatment.

All the patients were either private or out-patients, so that dithiazanine iodide permits effective treatment of single or multiple helminth infections in ambulatory patients. *G. Lapage*

PITCHFORD, R. J. **Cattle Schistosomiasis in Man in the Eastern Transvaal.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1959, May, v. 53, No. 3, 285–90, 2 figs. on pl. & 1 graph.

Surveys to determine the incidence of human infection with cattle schistosomes were carried out in four areas of the Eastern Transvaal. Examination of at least 3 different stools and urines from each patient was considered the minimum necessary to disclose light infections. Whole urines (after hard exercise) and whole stools were examined by concentration techniques and diagnosis was made on the size and morphology of the ova found. The patients were all normal African schoolchildren aged 7–19 years.

Of 78 patients in the Komatipoort area, 23% were infected with cattle schistosomes; the ova were found in urine or stool only or in both. In this area the incidence of *Schistosoma mansoni* or *S. haematobium* is about 85% for each parasite; cattle, sheep and goats are known to be infected with (probably) *S. mattheei* and the infectivity of *Bulinus* sp. may reach 50%.

In White River town only 1 (2·6%) of 38 patients was found with cattle schistosome ova in the urine. *S. mansoni* is absent but *S. haematobium* infection and cattle schistosomiasis is about 80% each. Of 54 patients in the Sigasi area 8 (14·8%) had cattle schistosome ova in urine, stool or both. Schistosomiasis in cattle is high (about 80%) and in man the incidence is, *S. mansoni* (30%), *S. haematobium* (80%).

In the Britz area 52 patients were negative for cattle schistosome ova in both urine and stool and none was found in the urine of a further 53. Incidence of *S. haematobium* is 40%, *S. mansoni*, nil. The incidence in cattle is not known but *Bulinus* give a high return of cattle schistosomes when mice are exposed to cercariae discharged from them [this *Bulletin*, 1953, v. 50, 733].

In another investigation not yet complete, the incidence of cattle schistosome

infection in women and children is 40%, based on 1 urine and stool examination.

Measurement of cattle schistosome ova showed them to be nearly twice the length of *S. haematobium* ova, the spine was much longer and they were subject to considerable variation in shape, some resembling the pattern of *S. bovis* and others that of *S. mattheei*. The finding of ova intermediate in shape and size between those of *S. haematobium* and cattle schistosomes raises the possibility of schistosome hybridization. *O. D. Standen*

BADR, M. & ZAHER, M. F. **Ileocystoplasty in the Treatment of Bilharzial Contracted Bladder.** *J. Egyptian Med. Ass.* 1959, v. 42, No. 1, 33–49, 2 diagrams & 7 figs. on 4 pls. [43 refs.]

"1. A review of the treatment of contracted bladder with evaluation of the various methods is discussed.

"2. A particular consideration of one of these lines—ileocystoplasty, its rationale, types and the problems involved are detailed.

"3. A description of the operation as applied to 6 bilharzial cases with demonstration of an example is given.

"4. An attempt to present particular aspects of bilharzia cases in relation to operative technique is made."

LASSANCE, M. Apparition à Stanleyville de *Biomphalaria a. pfeifferi*, vecteur de *Schistosoma mansoni*. [**Appearance of** *Biomphalaria pfeifferi*, **Vector of** *Schistosoma mansoni*, **in Stanleyville, Belgian Congo**] *Ann. Soc. Belge de Méd. Trop.* 1958, Oct. 31, v. 38, No. 5, 953–60.

The author describes the first discovery of a focus of *Biomphalaria pfeifferi* in the Stanleyville area of the Belgian Congo. Until 1956, *Physopsis africana* was the only vector of human schistosomiasis in this area and the transmitted infection of *Schistosoma intercalatum* was not of great clinical significance. The discovery of a potential vector for *S. mansoni* raised the possible introduction of intestinal schistosomiasis with its far greater morbidity and mortality rates. In general, *B. pfeifferi* has flourished in circumstances, altered by urbanization, which are less favourable for *P. africana*. Fears are expressed concerning the spread of *B. pfeifferi* to other breeding places where control measures would prove difficult.

In discussion of the means whereby the vector was introduced, transmission by birds or wind is dismissed as unlikely. More probably the snails are carried in fodder and litter cut from river banks for the cattle driven from Ituri to Stanleyville. *S. mansoni* is known to be established in the Ituri region and it is extraordinary that the transportation of the vector has not occurred before. While limnological conditions in Stanleyville may not be entirely suitable for *B. pfeifferi*, certain conditions, especially of temperature, might assist rapid development of *S. mansoni* infection in the vectors. Vigorous control measures must be introduced and steps taken for prevention of the introduction of *S. mansoni* to the area. *O. D. Standen*

BRYGOO, E. R. & CAPRON, A. Rôle d'hôte intermédiaire de *Biomphalaria madagascariensis* (Smith, 1882) dans le cycle de *Schistosoma mansoni* Sambon, 1907 à Madagascar. Démonstration dans le foyer d'Ambositra. [**Role of the Intermediate Host of** *Biomphalaria madagascariensis* **in the Cycle of** *Schistosoma mansoni* **in Madagascar. Demonstration of a Focus in Ambositra**] *Bull. Soc. Path. Exot.* 1959, May–June, v. 52, No. 3, 281–3.

MALDONADO, J. F. **The Host Parasite Relationships in Schistosomiasis mansoni.** *Bol. Asoc. Med. de Puerto Rico.* 1959, July, v. 51, No. 7, 228–37, 1 fig. [21 refs.]

PARAENSE, W. L. & DESLANDES, N. **Observations on an Afro-South American Planorbid.** *Anais Inst. Med. Trop.* Lisbon. 1957, Sept.–Dec., v. 14, Nos. 3/4, 471–82, 5 figs. on 2 pls. [15 refs.] English summary (9 lines).

The authors have made a careful anatomical comparison between *Taphius centimetralis* from Brazil and specimens said to be *Biomphalaria pfeifferi* from Mozambique. The African material was laboratory-bred in Lisbon. The authors found that the two lots of material were anatomically identical, also that living specimens were able to hybridize freely and they therefore suggest that both lots belong to the same species which should be called *Taphius pfeifferi*.

A discussion of the zoogeographical implications of these observations arrives at the conclusion that the African species was introduced to South America during the slave-trading days and has since spread its range extremely widely and rapidly. The authors point out [and it must be emphasized] that the particular characters which were used to confirm the specific identity of the material have not been mentioned by various workers who have described the anatomy of *Biomphalaria pfeifferi*, and it is perhaps best to wait until the findings have been confirmed by reference to wild-caught African material of definitely known origins. *C. A. Wright*

FRAGA DE AZEVEDO, J., FARO, M. M. da C. & PEQUITO, M. Margarida G. Sur l'autofecondation interne de l'*Australorbis glabratus olivaceus*. [**Internal Autofecundation of** *Australorbis glabratus olivaceus*] *Anais Inst. Med. Trop.* Lisbon. 1958, Dec., v. 15, No. 4, 843–53, 2 figs.

BARBOSA, F. S., BARBOSA, I. & CARNEIRO, Elizabeth. Técnica de inseminação artificial nos planorbídeos. [**Technique for Artificial Insemination of Planorbids**] *Anais Inst. Med. Trop.* Lisbon. 1958, June, v. 15, No. 2, 397–400. English summary (8 lines).

A technique for the artificial insemination of planorbid snails is described. The snails are narcotized with menthol for 5 hours, part of the body-whorl of the shell is cut away and the foot of the snail is gently pulled out until the mantle border covering the female genital opening is exposed. The spermatozoa are taken from the seminal vesicles of another snail, suspended in

0·7% saline and are introduced into the vagina of the narcotized snail by means of a fine Pasteur pipette with (for *Australorbis glabratus*) a maximum external diameter of 0·18 mm. *C. A. Wright*

POTENZA, L. Localizaciones aberrantes del *Schistosoma mansoni*. [**Aberrant Localizations of** *Schistosoma mansoni*] *Archivos Venezolanos de Patol. Trop. y Parasit. Méd.* 1959, July, v. 3, No. 1, 43–9. [31 refs.] English summary.

MEIRA, J. A. Tratamento da esquistossomose mansônica. [**Treatment of** *Schistosoma mansoni* **Infections**] Reprinted from *Labor.* 1959, v. 4, No. 6, 14 pp.

GARCÍA-PALMIERI, M. R., RAFFUCCI, F. L., DÍAZ-BONNET, L. A. & BERNAL-ROSA, J. F. **Shunt Surgery for Portal Hypertension due to** *Schistosoma mansoni*. **Evaluation and Management in Forty-One Cases.** *J. Amer. Med. Ass.* 1959, Sept. 19, v. 171, No. 3, 268–71. [18 refs.]

These 41 cases of advanced schistosomiasis were proved by rectal and liver biopsies, stool examinations and skin tests. 30 were males and 11 females. 21 were under 20 years of age and 31 were under 40. 33 had bled from oesophageal varices and the remainder had proved varices with enlarged spleens. Splenomegaly was present in 39 and hypersplenism in 37; 7 had ascites and 36 had hepatomegaly.

Patients admitted with active bleeding were first treated with oesophageal tamponade; blood replacement; electrolyte, fluid and vitamin regulation. Blood rich in platelets was used at operation in those with thrombocytopenia. Spleno-portography was done in all cases as an aid to determining the anatomy of the portal system.

The surgical procedures performed were portocaval shunt in 31, splenorenal shunt in 7, splenectomy alone in 2 and Merendino's operation in 1. Splenorenal shunt was discontinued because it was found to be inadequate in decompressing the portal system. There were 4 deaths, of which 2 were due to hepatic coma, one to cardiac arrest under anaesthesia and the last to cerebral haemorrhage. One patient has died since owing to pulmonary schistosomiasis causing pulmonary hypertension.

It is considered that repeated oesophageal haemorrhage is not a contra-indication to operation nor is an abnormal cephalin-cholesterol flocculation, but that a marked prolongation of the prothrombin time or jaundice are contra-indications.

In those patients surviving the operation there has been no further oesophageal bleeding. [But the authors give no dates and so there is no indication of the length of post-operative supervision.] The patient who died of pulmonary schistosomiasis suggests a hazard inevitable in short-circuiting the liver in schistosomiasis but the risk is thought to be justified. The authors conclude that portocaval shunt is the ideal procedure in these cases.

J. R. Rose

FALCÃO, E. de C. **Professor Pirajá da Silva. Incontestable Discoverer of "Schistosoma mansoni".** *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1959, Aug., v. 10, No. 2, 146–53. [16 refs.]

[See this *Bulletin*, 1953, v. 50, 1152.]

IIJIMA, T. **[Ecological Studies on the Variation of Population Density of *Oncomelania nosophora*, the Intermediate Host of *Schistosoma japonicum* in Natural Habitat]** *Japanese J. Parasit.* 1959, Aug, v. 8, No. 4, 586–600, 7 figs. [14 refs.] [In Japanese.]

The English summary appended to the paper is as follows:—

"The survey of the population dynamics of the *Oncomelania nosophora*, the vector snail of *Schistosoma japonicum*, was made at 6 different habitats of the snail. And the results were the following.

"1. Copulation of snails was recognized from March to September, with the highest incidence in May and September. No copulation was found in July, owing to the extraordinary desiccation of their habitats.

"2. The appearance of the offspring is found seasonally twice a year, which differed as the condition was different. During the autumn it is revealed that they were recognized rather in higher density.

"3. To reach adult it takes about five to six months in autumn and about three months in spring.

"4. During the period of winter and spring its death rate is considered to be ca. 10 to 20%.

"5. Owing to unusual dryness in summer during observation its death rate attained to ca. 85% at that time.

"6. The general tendency of the population dynamics was discussed."

MORI, K., OKAMOTO, K., NAKAGOME, T. & SUGIURA, K. **[Observations on the Habitat of *Oncomelania nosophora* with Filter Paper]** *Japanese J. Parasit.* 1959, Aug., v. 8, No. 4, 542–6, 7 figs. [11 refs.] [In Japanese.]

The English summary appended to the paper is as follows:—

"Habits of *Oncomelania nosophora* were observed by a new method using filter paper in the endemic areas of schistosomes. Observations were made in seven selected stations, such as rice fields, an irrigating ditch, a pool and two swamps, in Kofu District, during summer months, 1958. Snail population density was higher in rice fields, especially around the entrance of water from ditches, than other places tested. A few snails were found numerously at the opposite side of water entrance. No snail was found in swamps. Thus observations made in the field suggested that snails may be delivered with water by irrigation as stated by previous investigators. The filter paper method will be commended to measure the accurate snail population density in the field."

KOMIYA, Y. & IIJIMA, T. **The Local Difference of the Resistance of *Oncomelania nosophora*, the Vector Snail of *Schistosoma japonicum*, to Desiccation.** *Japanese J. Med. Sci. & Biol.* 1958, Dec., v. 11, No. 6, 455–9, 2 figs.

Collections of *Oncomelania nosophora* made in 8 different localities in Japan were tested for survival rate under laboratory controlled conditions of

desiccation. Of these localities, 4 were permanently wet and 4 dried out in certain seasons. 200 snails were examined in each group.

Very few snails survived 8 weeks of desiccation and those that did originated in the drier localities. At the 4th week the mortality rate among snails from the wet areas ranged from 50–81% whereas that of snails from the drier areas was 22–46%. A lower mortality rate was apparent in the "dry" area snails at each weekly examination up to the 8th week. It is suggested that a process of natural selection of individuals more resistant to desiccation had occurred in areas liable to seasonal drying out and that the results of laboratory observations could be accounted for in this way. *O. D. Standen*

ITO, J., WATANABE, K., NOGUCHI, M., MOCHIZUKI, H. & MURAKAMI, M. [**An Investigation of the Helminth Parasites of Dogs in Shizuoka Prefecture. (4) Trematodes**] *Japanese J. Parasit.* 1959, Aug., v. 8, No. 4, 453–7, 1 fig. [23 refs.] [In Japanese.]

The English summary appended to the paper is as follows:—

"Parasitic helminth of 192 dogs in Shizuoka Prefecture was examined by autopsy in the period from 1956 to 1957. The results of detailed observations on four species of trematodes were reported in this paper, namely, *Paragonimus westermanii* Braun, 1899, *Metagonimus yokogawai* Katsurada, 1912, *Metagonimus yokogawai* var. *takahashii* Suzuki, 1930, and *Pseudoheterophyes continua major* Yamaguti, 1939. These species are all infections to not only the dog but also the human being.

"Ten cases (5·2%) out of 192 dogs were proved to be infected with *P. westermanii* without regard to dog age and sex. It was also revealed that this species was widely distributed among the dog in this prefecture including both already known and not yet known endemic areas.

"As to *Metagonimus* spp., the infection rate was 23·3%, the number of worm in each dog was from 1 to 320 and the average was 20·4. These indicate that this species are remarkably densely distributed among the dog in this prefecture. So we must take care to prevent the infection for the residents.

"*Pseudoheterophyes continua major* is also a noticeable trematode of infections in human beings, though only one case out of 192 dogs was detected to be infected with this species."

CHOWANIEC, W. & DRÓŻDŻ, J. Badania nad biologią i ekologią *Galba truncatula* oraz nad formami larwalnymi *Fasciola hepatica*. [**Investigations on the Biology and Ecology of** *Galba truncatula* **and on the Larval Forms of** *Fasciola hepatica*] *Acta Parasitologica Polonica.* Warsaw. 1959, v. 7, Nos. 1/12, 143–60, 4 figs. on 2 pls. [23 refs.] English summary.

In an investigation of the behaviour of the miracidia of *Fasciola hepatica* towards the intermediate host it was found that they would penetrate *Galba truncatula* and *Limnaea stagnalis*, but no further development took place in the latter species. Field observations carried out in Poland over a number of years showed that larval forms could only be found in individual *G. truncatula* within the size range of 3–4·5 mm. 125 snails of size 3–3·5 mm. were infected in the laboratory with miracidia of *F. hepatica* and placed in a small natural pool for the duration of the winter; in the following March

33 snails were still alive and 8 contained rediae. It is concluded that *G. truncatula* is the only intermediate host of *F. hepatica* in Poland, and the remainder of the paper is devoted to an investigation of its ecology.

D. J. Bauer

LAINE, T., PÄTIÄLÄ, R., PARMALA, M. E. & LOKKI, O. **Diphyllobothriasis as an Infectious Disease in Finland.** *Ann. Med. Exper. et Biol. Fenniae.* Helsinki. 1959, v. 37, No. 3, 251–61, 2 figs. [12 refs.]

Diphyllobothriasis is recognized as a common and widespread disease in Finland. Thus previous authors have recorded the answers to questionaries addressed to practising physicians and these suggest that some 20–25% of the total population and 50% and upwards of the population in Eastern Finland are infected [this *Bulletin*, 1951, v. 48, 572], while 9 independent investigations (the results of which were published between 1927 and 1958) of certain sections of the population for the presence of ova in the faeces gave positive findings which varied from 6·2% in one instance to 66% in another.

The authors of the present paper write: "As the above investigations give estimates based on hypotheses or are concerned only with a certain section of the population, they inevitably fail to give a reliable overall picture of the incidence of infestation, the more so as they are not based on reliable statistical sampling methods". In order to introduce an additional criterion for the incidence of *Diphyllobothrium* infection, the authors "studied the situation on the basis of sales of common anti-helminthics sold in Finland". They also studied notifications to the Medical Board and as a result of their statistical analyses of the figures concerning the sale of some 405,000 doses (during the years 1950, 1951, and 1952), and the other criteria referred to, they reach the following conclusions:—"It is obvious that in actual fact an average of about a fifth of Finland's population is infested with parasites. One individual may be infested several times although the worm is definitely expelled on each occasion. There has probably been some improvement in the situation of late, but much enlightenment work is needed, above all to change the methods of preparing the food, before we can expect this national disease to start disappearing". The statistical data summarized on the basis of the various sources cited above are shown in a diagram. *R. M. Gordon*

HUTCHISON, W. F., RICKS, H. C., Sr. & WOOLDRIDGE, Dorothy S. **A New Record of Human Infection with *Dipylidium caninum* in the United States.** *Amer. J. Trop. Med. & Hyg.* 1959, Sept., v. 8, No. 5, 603.

"The first case in Mississippi of human infection with the double-pored dog tapeworm, *Dipylidium caninum*, is reported. This appears to be the ninth human infection to be recorded from the United States."

BECK, J. W. **Report of a Possible Human Infection with the Acanthocephalan *Moniliformis moniliformis* (Syn. *M. dubius*).** [Research Notes.] *J. Parasitology.* 1959, Oct., v. 45, No. 5, 510.

A mature male *Moniliformis moniliformis*, 7 cm. long, was apparently vomited by a patient in Florida during a gastro-intestinal upset. It is stated

that only 3 previous naturally occurring infections have been reported in man [but references to the literature are not given]. *H. J. O'D. Burke-Gaffney*

HSIEH, Hsien-Chen, MAA, Yih-Huei & CHEN, Tien-Shian. **The Treatment of** *Raillietina madagascariensis* **with Dithiazanine Iodide.** *J. Formosan Med. Ass.* 1959, May 28, v. 58, No. 5, 258–60.

"This paper describes clinical and laboratory examinations made on a child infected with *Raillietina madagascariensis* and its successful treatment with dithiazanine iodide [200 mgm. daily for 3 days]."

CANAL FEIJÓO, E. J. Nuevo caso de parasitismo por *Taenia solium* en la República Argentina. [**A New Case of** *Taenia solium* **Infection in Argentina**] *Rev. Facul. Med. de Tucumán.* 1958, July, v. 1, Nos. 1/2, 35–8.

The English summary appended to the paper is as follows:—

"The author reports a new clinical case of parasitism caused by *Taenia solium*, in a patient coming from the province of Santiago del Estero, as in two previous cases from the same author and collaborators, this one being the fifth in Argentine."

BROOKS, T. J., Jr., WEBB, W. R. & HEARD, K. M. **Hydatid Disease. A Summary of Human Cases in Mississippi.** *Arch. Intern. Med.* 1959, Oct., v. 104, No. 4, 561–7, 5 figs. [28 refs.]

"The importance of hydatid disease in the production of human morbidity and mortality throughout most parts of the world is emphasized. Reference is made to the accumulation of data concerning its prevalence and importance in North America. Summaries are presented of three cases of hydatid infection in residents of Mississippi, none of whom had ever lived outside of this state (Cases 2, 6, and 7). Two additional cases had no known residence outside of Mississippi, but it could not be established with certainty that they had never left the state (Cases 1 and 5). In addition there have been two cases reported from Memphis, in persons who had been born in Mississippi and who had lived for various lengths of time in this state (Cases 3 and 4). Two unconfirmed reports from Greenville, Miss., and one from Vicksburg, Miss., are also recorded.

"This series of cases of human echinococcosis lends support to the previously established fact of the endemicity of this disease in the lower Mississippi valley. It now appears that infection with the dog tapeworm, Echinococcus granulosus, constitutes a significant health hazard in Mississippi, Tennessee, Louisiana, and several other southern states. This is especially true for persons engaged in farming and associated occupations, where there is close contact between man, sheep, pigs, cattle, and dogs. Attention is called to the likelihood that infections with this parasite will be seen with increasing frequency in the United States unless active programs of control are instituted."

LUBINSKY, G. **Anomalies of Oncotaxy in Two Species of *Echinococcus* from North America.** *Canadian J. Zool.* 1959, Oct., v. 37, No. 5, 793–801, 20 figs. [23 refs.]

"Anomalies of oncotaxy of adult and larval scoleces of *Echinococcus multilocularis* and *E.* aff. *granulosus* from North America are described. It is pointed out that some of these anomalies affect characters usually believed to be characteristic of species. Abnormal oncospheres of *E. multilocularis* with 2, 7, and 12 hooks are described and the probable origin of the giant oncospheres is discussed."

KOBAYASHI, A., SUZUKI, N., YASUDA, I., KUMADA, M., ISHII, T., OGAWA, H. & KOMIYA, Y. [**The Resistance of Hookworm Eggs to Lower Temperatures**] *Japanese J. Parasit.* 1959, Aug., v. 8, No. 4, 637–41, 1 fig. [13 refs.] [In Japanese.]

The English summary appended to the paper is as follows:—

"Studies on the resistance of hookworm eggs to varying temperatures may yield clues to the prevention of hookworm disease. The present experiments have been designed primarily to investigate the resistance of eggs of *Ancylostoma duodenale* and *Necator americanus* to lower temperature ranging from +5°C. to −5°C.

"Results obtained were as follows:

"1) Exposure to +5°C. About a half of *A. duodenale* eggs lost ability to hatch after 30 hours' exposure and 30 to 40% of the eggs remained alive after 72 to 96 hours.

"Forty per cent of *N. americanus* eggs exposed to the same temperature for 3 hours retained the ability and after 30 hours' exposure most of all eggs were killed.

"2) Exposure to 0°C. Nearly a half of *A. duodenale* eggs were killed in a day after exposure to 0°C. and percentage of eggs survived reduced to less than 30% after 72 hours' exposure.

"As far as *N. americanus* eggs were concerned, only 13·8% of them were found alive after 3 hours' exposure and no hatching occurred after 24 hours.

"3) Exposure to −5°C. Destructive effects of such low temperature as −5°C. and 0°C. on the hookworm eggs of both species were very active compared with those of temperatures at +5°C. and 0°C. 58·9% of *A. duodenale* eggs exposed to −5°C. for 3 hours were found alive and after 9 hours' exposure no hatching of larvae occurred.

"In the case of *N. americanus* eggs only 7·2% of them showed the ability to hatch after 3 hours' and nearly all of them were killed after 9 hours.

"4) The results above-mentioned indicate that *A. duodenale* eggs are more resistant to lower temperature than *N. americanus* eggs."

PANCALDO, A. Sull'impiego del gluconato ferroso nell'anchilostomiasi. [**The Use of Ferrous Gluconate in Ankylostomiasis**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1959, July, v. 40, No. 7, 407–14, 1 fig. [10 refs.] English summary (8 lines).

At the Clinic for Tropical Diseases of Messina University 24 patients suffering from ankylostomiasis whose ages ranged from 7–59 years, mostly in

the 20–40 age-group, were treated with tablets containing 0·2 gm. Fe gluconate, 6 per day, for periods varying from 4 to 8 weeks; the red cell count, colour index and plasma Fe being controlled before and after treatment. In several patients 4–5 days after treatment started there was a marked reticulocyte response, and all showed an obviously improved blood picture after 4 weeks, but complete return of the plasma Fe to normal took more than 8 weeks. The subjective symptoms of iron deficiency also disappeared. 2 young persons had slight gastric disturbance for the first few days but otherwise no side effects were noted, and doses even one-third higher were well tolerated.

The author considers that the duodenal lesions do not prevent the absorption of the Fe gluconate and that this is possibly due to the particular ionized and bivalent form of the Fe salt used.

Fe gluconate is quite suitable for oral administration in the anaemia of ankylostomiasis. *W. K. Dunscombe*

HUCHTON, P. & HORN, R. **Strongyloidiasis.** *J. Pediatrics.* St. Louis. 1959, Nov., v. 55, No. 5, 602–8. [27 refs.]

"A report of 16 cases of strongyloidiasis, including 3 fatal cases with autopsies in children, and a review of the literature are presented. An effort has been made to emphasize the more important clinical and pathologic features of this disease."

[A report from Tennessee.]

FERRIOLLI, F., Jr. Diagnóstico da estrongiloidíase. Modificações do método de Baermann-Moraes. [**Diagnosis of Strongyloidiasis. Modification of Baermann-Moraes' Technique**] *Rev. Inst. Med. Trop. São Paulo.* 1959, July–Aug., v. 1, No. 2, 138–40. English summary.

A modification of Baermann's method in the diagnosis of strongyloidiasis was described by DE MORAES [this *Bulletin*, 1948, v. 45, 801] and further modified by COUTINHO *et al.* (*Rev. Clin.* São Paulo, 1951, v. 27, 1). The present author, in São Paulo, has found this modification superior to direct examination, sedimentation and the zinc-sulphate centrifuge-flotation techniques.

However, he still considers it to have some disadvantages because of the use of gauze over the metal screen and he lists these as failure of the gauze to retain small particles of faeces, contamination by faeces of the gauze after absorption of water, obstruction to the passage of larvae by sodden gauze, undesirable exposure of the faeces to air, and unnecessary expense.

He has therefore replaced the gauze by a metal screen with a finer mesh than that formerly used. This is made of copper or bronze and has 35 meshes per cm. This is adapted to the funnel of the apparatus in such a manner that it is submerged about 2 or 3 mm. below the level of the water. A cover is placed on it and has 1 or 2 perforations to avoid the formation of an air lock. The screen has a handle for easy manipulation and is easily washed: it is very resistant and can be sterilized in a flame.

The author has compared this modification with that of Coutinho *et al.* with 30 specimens of faeces containing larvae, and all were positive by both methods. However, even with this modification, smaller particles of faeces will

pass through when liquid faeces are used and this renders the water turbid and the search for larvae difficult. The author therefore tried lining the screen with tissue paper of the kind used for paper handkerchiefs. This reduced the percentage of positive findings from 100% to 82% in 35 specimens examined with and without tissue paper. Nevertheless, this result is claimed to be far better than that obtained with the sedimentation and zinc-sulphate methods. In view of the reduction of positive results found in this way, it is recommended that the use of tissue paper should be reserved solely for use with diarrhoeal faeces. *H. J. O'D. Burke-Gaffney*

ATCHLEY, F. O. **Significance of Human Intestinal Helminths in Eastern Kentucky.** [Research Notes.] *J. Parasitology.* 1959, Oct., v. 45, No. 5, 518.

In the course of a survey of the population for intestinal parasites in an area in Kentucky [this *Bulletin*, 1957, v. 54, 359], examination of faeces was also made on 1,244 patients admitted to one hospital in Floyd County in 1955–56. Helminthic infections were found in 32% and were: *Ascaris* (12%), *Trichuris* (14%), *Strongyloides* (5%) and hookworms (1%). In 7%, helminthiasis had been diagnosed clinically. Surgical complications of ascariasis were well known to the local doctors, but the local populace appeared to be indifferent to helminthiasis, partly because such infections were commonplace and partly because of a lack of awareness of their "more occult effects". Concern was obvious only when infants under 2 years were infected: among 162 children of this age in the normal population, 19% were harbouring *Ascaris*. Enterobiasis also seemed to be widespread although it was not studied specifically.

H. J. O'D. Burke-Gaffney

PATZ, I. M. **Acute Eosinophilic Pneumonia possibly due to Infection with** *Ascaris lumbricoides*. *Central African J. of Med.* 1959, Aug., v. 5, No. 8, 399–404, 3 figs. [13 refs.]

12 adult Bantu presented with acute pulmonary symptoms; 11 worked at a local brickfield, and the 12th lived there, and all had attended an illicit beer-party about 6–8 days before the onset of symptoms. The onset was with malaise, headache, and general pains; then came rigor, pyrexia, and a very exhausting dry cough, with asthmatic breathing and scanty white sputum. Temperatures rose to 100–104°F. There was no consolidation of the lung, but X-ray pictures showed diffuse bronchopneumonic mottling. Eosinophils in the blood formed 7–63·5% of the white cells, and were also seen in the sputum. The eosinophilia cleared in less than 8 weeks, well after the clinical recovery which was complete, without relapse, by about the 16th day.

It is pointed out that both in its nature and course this remarkable illness resembled closely that suffered by KOINO [this *Bulletin*, 1923, v. 20, 235] who infected himself with 2,000 *Ascaris* eggs. When first seen on the 4th to 6th day, 8 of the patients had *Ascaris* eggs in the stools; 3 more showed eggs some weeks later. Several of them returned subsequently and complained of vomiting roundworms, or passing them in the stools. It was unfortunate that only single specimens of sputum were examined for larvae, and all these were negative. Thus *A. lumbricoides* could be incriminated on circumstantial

grounds only. So violent an epidemic must be very rare in *Ascaris* infections, and suggests a massive source of embryonated eggs, but all the patients refused to give any information about the party. *Alan B. Raper*

HERTWIG, F. & PECH, Z Obturationsikterus bei Askariasis. Ein kasuistischer Beitrag aus Korea. [**Obstructive Jaundice from Ascariasis**] *Ztschr. f.d.g. Hyg. u. ihre Grenzgebiete.* Berlin. 1959, Sept.–Oct., v. 5, No. 5, 307–9.

A case in Korea.

See also p. 126, NEGHME *et al.*, Ensayo de terapéutica antiparasitaria en masa, de un grupo de asiladas del Hospital Psiquiátrico de Santiago. [**Mass Antiparasitic Treatment in a Group of Inmates of the Psychiatric Hospital at Santiago**]

VORA, D. D. **An Experimental Study of Anthelmintic Action of Oxygen against** *Ascaris lumbricoides,* **by Exposure to Different Concentrations of Oxygen for Variable Lengths of Time.** *Indian J. Med. Sci.* 1958, Aug., v. 12, No. 8, 609–17, 1 fig. [13 refs.]

Adult roundworms live in the gut in almost anaerobic conditions and gaseous oxygen intubated into the gut has been used successfully as an anthelmintic [this *Bulletin*, 1955, v. 52, 1215; 1956, v. 53, 345]. Roundworms obtained from patients or at autopsy were exposed experimentally to oxygen-nitrogen mixtures. Mortality and survival were found to be unchanged by oxygen concentration of less than 40% but higher concentrations had a marked effect. *W. E. Kershaw*

DOZANSKA, Wiera & IWANCZUK, Irena. Wpływ różnych związków chemicznych na żywotność jaj *Ascaris.* [**The Influence of Various Chemical Compounds on the Viability of** *Ascaris* **Eggs**] *Acta Parasitologica. Polonica.* Warsaw. 1959, v. 7, Nos. 1/12, 73–94. [19 refs.] English summary.

The authors have investigated the effect of contact with a number of organic and inorganic compounds on the viability of the eggs of *Ascaris suis.* After exposure to the test substance for periods ranging from 5 minutes to 11 days the eggs were tested for viability by transfer to Barbagall's fluid. The results are presented in a series of tables. The most marked ovicidal effects were noted with mineral acids in concentrations exceeding 10%, solid quicklime, acetic acid, iodine (0·13% solution) and tincture of iodine, 5% phenol, 10% lysol and 2% chloroform. Little or no effect was observed with 40% formaldehyde, 2% potassium permanganate, 10% potassium dichromate and a number of other substances. *D. J. Bauer*

KUNII, Y. [**Studies on the Ovicidal Effect of Mustard Oil. (4) Influence of Temperature upon the Ovicidal Effect of Mustard Oil**] *Japanese J. Parasit.* 1959, Aug., v. 8, No. 4, 575–9, 2 charts. [In Japanese.]

The English summary appended to the paper is as follows:—

"The author examined the ovicidal effect of phenyl and tolyl mustard oil

at 28°C, 20°C, 17°C, 15°C, 9°C, 5°C, 1°C and −7°C, respectively, to know an effective ovicidal temperature range to ascaris eggs.

"The results were as follows:

"The ovicidal effect of tolyl mustard oil at 10^3 concentration was 100% mortality in every condition of the present examination.

"The effective ovicidal temperature for mustard oil was about 15°C in 7 days' treatment, but the temperature had to be raised to higher than 15°C as the period treatment was shortened.

"From the above results, the effective ovicidal temperature of mustard oil is somewhat concerned with the development of ascaris eggs."

FUJITA, K. [**Studies on the Ovicidal Effects of Various Agricultural Chemicals on *Ascaris* Eggs. (1) Experiments *in vitro***] *Japanese J. Parasit.* 1959, Aug., v. 8, No. 4, 580–85. [15 refs.] [In Japanese.]

The English summary appended to the paper is as follows:—

"Many kinds of chemicals have already been tested for their ovicidal effects for the purpose of destroying helminth eggs in feces, and some of them were found to be effective. In the present experiments, altogether 22 kinds of agricultural chemicals which are used for destroying harmful arthropods and weeds in the fields were tested for their ovicidal effects. Those chemicals belonged to organic phosphor-compounds, chlor-compounds, chlor-benzol compounds, anti-acarina drugs or disinfectants. For the screening purpose they were dissolved in 1:1,000 concentration and ascaris eggs obtained from uteri of pig ascaris were immersed in those solutions for periods of 7, 12 and 18 days at 27°C. After these periods, eggs were washed by repeating the centrifugation and were kept in water for 50 days at 27°C to examine what percentages of eggs would degenerate.

"The chemicals which were so effective as to destroy more than 80% of eggs by the immersion in the 1:1000 solution for 12–18 days were chlorthion (3-chloro-4-nitrophenyl dimethyl thiophosphate), isochlorthion (2-chloro-4-nitrophenyl dimethyl thiophosphate), D.D.T., pentachlorphenol, sappiran (p-chloro-p-chlorobenzene sulfonate), koromite (4-dinitro-cyclohexyl phenolacetate) and cresol-soap solution. Chlorthion and isochlorthion were as much effective at the 1:2000 dilution and pentachlorphenol, koromite and cresol soap solution were also as much effective even at the 1:4000 dilution. Chlorthion and pentachlorphenol worked rapidly: relatively short period of immersion was enough to destroy most of the eggs. D.D.T. and sappiran worked slowly, isochorthion and koromite were intermediate."

SOUTH PACIFIC COMMISSION. Noumea, New Caledonia. **Annotated Bibliography of Filariasis and Elephantiasis. Part 4—Treatment** [IYENGAR, M.O.T.] *Technical Paper No. 124.* 1959, Aug., xii + 177 mimeograph pp., 1 map. [6s.]

See this *Bulletin*, 1958, v. 55, (430).

WU, Chia-Chu. [**A Report on Filariasis and its Mosquito Vectors in Wuchang, Hupeh Province**] *Acta Microbiologica Sinica.* 1959, May, v. 7, Nos. 1/2, 16–24, 1 chart. [23 refs.] [In Chinese.]

The English summary appended to the paper is as follows:—

"In this paper, the results of a survey of filariasis and its mosquito vectors carried out from May to November, 1957 at Tutitong, a village 30 km south of Wuchang were reported.

"Examination was made of 2 Farm Cooperatives with a total population of 1074, and it was found that the infection rate, including cases of lymphangitis and elephantiasis, was in the range of 19·04–76·85%; the separate average rates of the two Cooperatives were 49·00 and 34·18%. All the worms found were of the malayi type. The youngest patient in which microfilaria was found in the blood was a two year old child, while the oldest, 81 year old. There was no distinct relationship between the incidence of filariasis and the age or sex of the patients.

"Of the common species of mosquitoes, 4 were found in human dwelling and cow sheds. These were: *Anopheles hyrcanus* var. *sinensis*, *Armigeres obturbans*, *Culex fatigans*, and *Culex tritaeniorhynchus*. Among these, *A. hyrcanus* var. *sinensis* was the predominating species.

"On dissecting 285 *A. hyrcanus* mosquitoes, 92 *Culex tritaeniorhynchus* and 144 *Culex fatigans* mosquitoes, it was found that the natural infection rates were 25·61, 4·3, and 2·1% respectively. However, only in *A. hyrcanus* mosquitoes were infective filaria embryos (3·5%) found.

"The author concluded that *A. hyrcanus* var. *sinensis* is the only vector in this district. And basing on the meteorological data, the seasonal prevalence of *A. hyrcanus* var. *sinensis*, and the seasonal distribution of the infective filaria larvae in these mosquitoes, the author further concluded that the main transmission period was from June to August, although in the late spring and late autumn, certain amount of transmission may also take place."

CHU, Su-Fui, SUN, Chun-Huang & CHEN, Hsiao-Hsun. [**Observations on Filariasis in Chung Hua Hsien, Kwangtung**] *Acta Microbiologica Sinica.* 1959, May, v. 7, Nos. 1/2, 25–31. [In Chinese.]

The English summary appended to the paper is as follows:—

"1. An endemic area of *filariasis* was found as a result of a survey in an area within a distance of 60 kilometers around the town of Tse Kao, Chung Hua Hsien. 1,450 farmers in the town of Tse Kao were examined by blood smears and physical examinations. 415 of them were found to be infested (28·62%). 174 and 307 farmers were examined in the districts of Lu Tien and Tai Ping Chang respectively. They were all negative for microfilariae. Among 434 and 396 farmers examined in the districts of Shi Kang and Liang Kao respectively, 4 (0·9%) and 1 (0·25%) of them were found to be infested.

"2. The microfilariae found in this area were all of the species of *Microfilaria bancrofti*.

"3. The rate of infestation in the town of Tse Kao rises with the increase of age. The older the age the heavier the rate of infestation. The heaviest rate, i.e. 54·49%, was found in the age group of 41–50.

"4. In the town of Tse Kao, *filariasis* was found more frequently in men

than women, probably because the female genitalia was less affected by filaria worms.

"5. *Culex fatigans* was the major species of mosquitoes found in houses in the town of Tse Kao. Among 1,134 *C. fatigans* dissected, the rate of infestation was 7·4%. As fully mature infective larvae were found, it can be concluded that *C. fatigans* was the vector responsible for the transmission of filariasis in this area.

"6. Chyluria and signs about external genitalia were the chief findings in the physical examinations of 1,450 persons. As to the lymphatic system of the extremities, only 2 were found to have mild elephantiasis of the legs. 58 patients had history of chyluria. It was distributed evenly among the two sexes (male 15·15%, female 11·92%). All signs about external genitalia were found in men; none was found in women."

WHARTON, R. H. **Age Determination in *Mansonioides* Mosquitoes.** [Correspondence.] *Nature*. 1959, Sept. 12, v. 184, Suppl. No. 11, 830–31.

Wild-caught *Mansonioides* (*M. longipalpis* and *M. uniformis*) in Malaya were examined for evidence of their age by dissection for their corpora lutea [follicular relics]. This is known to be a basis for precise age estimation under laboratory conditions [this *Bulletin*, 1959, v. 56, 245].

The interesting result from this field study in Malaya, where mosquito populations are dense, is that 40% of 22 females with infective larvae of *Wuchereria* and *Dirofilaria* (which require 10 days for development) had only one corpus luteum, *i.e.* had laid only one batch of eggs. Allowing 3 to 4 days for a gonotrophic cycle, one might have expected at least 2 or 3 follicular relics in infective mosquitoes. It is reasoned that, being caught a mile from the nearest breeding place and 3 from the nearest houses, time was lost in travelling in search of a second host and to the oviposition site. Clearly, such time lags must be taken into account in estimating age, and it may be impossible to do so in certain conditions such as those reported. But, it is noted, delays between cycles may be negligible for a species living close to its hosts and breeding places, and the interpretations of age remain valid.

There is some account also of the value of water-mite infestation of *Mansonioides* and the appearance of the Malpighian tubes in *Mansonioides* for differentiating nulliparous and parous females [see also *ibid.*, 1959, v. 56, 78].

D. S. Bertram

TURNER, L. H. **Studies on Filariasis in Malaya: Treatment of *Wuchereria malayi* Filariasis with Diethylcarbamazine in Single Daily Doses.** *Ann. Trop. Med. & Parasit.* 1959, June, v. 53, No. 2, 180–88, 2 figs. [10 refs.]

70 patients from 2 areas on Penang Island with filariasis due to *Wuchereria malayi* (nocturnal periodic form) [this *Bulletin*, 1958, v. 55, 293; 1959, v. 56, 551] were treated with diethylcarbamazine given in different dosages once per day. Diethylcarbamazine was used as syrup (Hetrazan) and as tablets (Banocide). The syrup, diluted 1:10 with water, was used for the smaller

doses. Tablets were used for the larger doses. The dosage, which varied from 0·1 mgm./kgm. to 4·0 mgm./kgm. for 1 to 5 days, is shown in a table.

Because of reactions, patients with high microfilaria counts were given smaller doses. The response, especially to smaller doses, varied considerably. Larger doses were more rapidly effective and the best results probably depended on a daily dose of 1·0 mgm. per kgm. or more. The simultaneous addition of phenergan (promethazine) with the diethylcarbamazine appeared to augment its effects in some cases.

The daily dose was later increased at various rates, according to the severity of the reaction and the microfilaria count, to 10 mgm. per kgm. or more. There was much individual variation, but more than half (24 out of 41) of the patients were cleared by a total dose of less than 20·0 mgm. per kgm. and all but one by less than 60 mgm. per kgm. Febrile reactions (100°F. or higher) affected 54 of 55 microfilaria carriers when they received dosages which were effective against the microfilariae, and the temperature rose to 102°F. or higher in 80%. Just as identical dosages varied from patient to patient in their effect against microfilariae, so did they vary in the intensity of the febrile reaction. On the whole, the more microfilariae were removed from the blood, the more severe was the resulting reaction.

Lymphadenitis and lymphangitis separately occurred in 4 and 7 patients respectively and together in another 4. The cause of these local reactions is not certain. They were independent of the presence of microfilariae and probably were examples of incomplete forms of the acute adeno-lymphangitis syndrome which occurs spontaneously in untreated patients [*ibid.*, 1939, v. 36, 149; 1959, v. 56, 862].

Patients from the two areas differed in their liability to develop local reactions, 4·3% in Sungei Batu in contrast to 28% in Balik Pulau.

The limit of tolerance is marked by dizziness, light-headedness, nausea (half an hour after the dose and persisting for 1–3 hours), and anorexia. No skin eruptions were seen. Tablets were taken on an empty stomach and the dosage adjusted until no symptoms were produced. There was considerable variation in the amount of drug tolerated by different individuals, but it is much lower than that in African patients [*ibid.*, 1953, v. 50, 171].

After discharge from hospital all patients returned to homes in highly endemic areas. The disappointing long-term results may therefore have been due to re-infection. When re-examined at varying intervals no less than 11 out of 34 patients were found again to have microfilariae in their blood, though in small numbers. These findings confirm the statement by WILSON and REID (*Report Inst. Med. Res. Malaya for 1952*; 1954, p. 48) that, when microfilariae reappear in the blood, they seem to do so earlier and more often in patients whose pre-treatment counts were high (more than 200 microfilariae per 60 cmm. blood at 9 p.m.). No appreciable effect on elephantiasis could be detected by means of a water-displacement device, but it was impossible to re-examine the patients to determine whether the condition became static after treatment.

Phenergan, in single doses of 10 mgm., was given with diethylcarbamazine to 9 children (7–12 years old). The febrile reactions were not modified. This drug may even augment the effect of diethylcarbamazine against microfilariae.

[See also this *Bulletin*, 1958, v. 55, 922.] *Philip Manson-Bahr*

J. PARASITOLOGY. 1959, Oct., v. 45, No. 5, 499–518. *Dirofilaria magnilarvatum* **n.sp. (Nematoda: Filarioidea) from** *Macaca irus* **Cuvier. I. Description of the Adult Filarial Worms** [PRICE, D. L.], 499–504, 8 figs. on 2 pls. [13 refs.] **II. Microscopical Studies on the Microfilariae** [TAYLOR, Angela E. R.], 505–9, 3 figs. **III. The Behavior of the Microfilariae in the Mammalian Host** [HAWKING, F.], 511–12. **IV. Notes on Larval Development in Mansonioides Mosquitoes** [WHARTON, R. H.], 513–18, 1 fig.

VANBREUSEGHEM, R. Primer caso venezolano de sarna filariana por *Onchocerca volvulus*. [**First Venezuelan Case of Filarial Itch due to** *Onchocerca volvulus*] *Archivos Venezolanos de Patol. Trop. y Parasit. Méd.* 1959, July, v. 3, No. 1, 170–84, 3 figs. [14 refs.] English summary (4 lines).

RODGER, F. C. **Comparison of the Effect upon Onchocerciasis of Five Drugs and Selection of the one best able to prevent Ocular Complications.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1958, Sept., v. 52, No. 5, 462–7. [12 refs.]

The author assessed the relative values of 5 drugs, using as criteria of cure the immobility of all worms and their contained microfilariae in nodules excised from patients after treatment with the drugs. The density of microfilariae in the skin was also assessed. The drugs used were 1-ethyl-3-6-dimethyl-2-phenyl-4-pyrimido-2-cyanine chloride designated Cyanine, administered by intravenous infusion over 1½ hours in maximal doses of 1 mgm. per kgm. of body weight at intervals of 2–4 days on 3–5 occasions. The second drug used was arsenamide sodium or Caparsolate; it was given intravenously in 1% solution and the total dose was 460 ml. in 37 days. Sodium antimony tartrate BP was given intravenously to another group of patients, the total dose being 15½ grains administered over 31 days. To a third group, diethylcarbamazine in total amounts of 10 gm. was administered over 23 days and to the fifth group suramin was given in total doses of 12 gm. administered over 41 days.

One week after conclusion of the courses of treatment all nodules detectable in the patients were excised at the same time. Cyanine, arsenamide and sodium antimony tartrate were unsuccessful in killing either the adults or the microfilariae at the levels of drug administered. None of the drugs were found to kill adult worms and only diethylcarbamazine and suramin killed microfilariae, the former doing so completely.

Complications following the use of Cyanine included thrombosis of veins, albuminuria and lowering the blood pressure; arsenamide caused vomiting and abdominal cramps, albuminuria, headache and dermatitis; the only complication of sodium antimony tartrate noted was vomiting; diethylcarbamazine therapy was followed by no serious side effects, the worst being transient pyrexia, pruritis, arthralgia and myalgia; treatment with suramin was followed in every case by headaches, diarrhoea and albuminuria.

The conclusion is reached that as none of the drugs administered killed adult onchocerca, the most satisfactory therapeutic approach is to reduce the microfilarial population in the body to a level at which ocular complications will

be unlikely to occur and for this purpose the most satisfactory available drug is diethylcarbamazine. *A. W. Woodruff*

RICE, D. T. **Guinea Worm in Semra (M.P.).** *Indian J. Pub. Health.* 1959, July, v. 3, No. 3, 289–93, 4 figs. and 1 map.

This is a straightforward, well-documented account of guinea-worm infection in an Indian village of about 500 inhabitants who obtained their water from "ancient step-down wells". In 1956 28 persons were found to be infected, at which time the "Gaon Sathee, or village worker" encouraged the people to strain their water; at the same time a heavy dose of bleaching powder was put into the wells and people with emerging worms were prohibited from entering the wells. In 1957, presumably as a result of these measures, the number of persons demonstrably infected with guinea worm was reduced to 8, while the number of worms per person was also reduced. [The number of worms per person in 1957, as shown in the table, appears to be misplaced.]

R. M. Gordon

CHIU, Jui-Kuan. *Gnathostoma doloresi* **Tubangui, 1925 (Nematoda: Gnathostomidae) found in Formosan Wild Boar.** *J. Formosan Med. Ass.* 1959, May 28, v. 58, No. 5, 261–8, 9 figs. [28 refs.]

FURUNO, O. **[An Immunological Study on Gnathostomiasis (Precipitin Ring Tests and Sarles' Phenomenon)]** *Igaku Kenkyu.* Fukuoka. 1959, Aug., v. 29, No. 8, 2802–22, 15 figs. [92 refs.] [In Japanese.]

The English summary appended to the paper is as follows:—

"The intradermal reaction is accepted as the most reliable of all means of diagnosis for gnathostomiasis. The author evaluated the precipitin reaction as a serological means of diagnosis for the disease. The 3rd stage larvae of the *Gnathostoma spinigerum* from the fresh-water fish *Ophicephalus argus*, imaginal forms of the worm from cats experimentally infected with the parasite, and imaginal forms of the *Gnathostoma doloresi* from wild boars were prepared into different saline extracts; the precipitin reaction and, for comparison, Sarles' phenomenon, in the blood serum from rabbits infected or immunized with the extracts and from patients with gnathostomiasis were examined.

"(1) The serum from rabbits given a varying number of the larvae orally was found 3–14 days after the infection to contain some substances which precipitated in the presence of the extract of the whole body of the larva; the precipitin reached its maximum potency, 6400-fold, in 6 weeks and declined in potency in 10–18 weeks.

"(2) Comparative examination of extracts of different parts of the worm disclosed that in the larva, the esophageal, the intestinal, and the cuticular (including the head bulbs) were antigenic in this order of potency and that in the adult the antigenicity was varied, in declining order of potency, in the reproductive, the cuticular, the esophageal, and in the intestinal tract. In the fraction of adult *Gnathostoma doloresi* an extract of entire worm was less antigenic than the sugar fractions extracted and more antigenic than the protein fractions extracted.

"(3) In their action as antigen against the serum from an infected rabbit, the extract of a larva, that of an adult worm, and that of adult *Gnathostoma doloresi* were varied in declining order of potency: the flesh extract of the fresh-water fish *Ophicephalus argus* and the feed solution for the larval and the adult form were far less potent; the extract of the roundworm from the pig and that of the lung fluke *Paragonimus westermanii* had no such action.

"(4) The precipitin reaction of the serum from a rabbit sensitized by intravenous injection of an antigen has disclosed that an emulsified larva produced a stronger antibody than an emulsified adult form, that either form produced a stronger antigen in its extract in solution than in its emulsified form, and that the female worm produced a stronger antigen than the male. The extract of a larva, when injected intradermally for sensitization, did not result in the formation of highly immune serum in the animal treated.

"(5) In serum from an infected rabbit Sarles' phenomenon made its first appearance within a definite period, irrespective of the number of the worms used for infection, and was most marked in the 2nd–3rd week after the injection; the precipitin reaction was most intense 6400-fold, in the 6th week or later.

"(6) The precipitin reaction in serum from a patient was 800-fold or more in potency and highly specific. This reaction, appearing concurrently with the intradermal reaction, and Sarles' phenomenon not appearing, is an indication that it might profitably be used together with the intradermal reaction as a valuable means of diagnosis for gnathostomiasis."

HAYASHI, S., SATO, K., TAKADA, A., SHIRASAKA, R., FUKUI, M., SASA, M., SUKIGARA, H. & HIRAKI, K. **Studies on the Epidemiology of Pinworm** (*Enterobius vermicularis*) **in Japan.** *Japanese J. Exper. Med.* 1959, Aug., v. 29, No. 4, 213–50, 6 figs. [58 refs.]

This paper records the results of examination by means of perianal Scotch-tape swabs of 3,048 persons during surveys in 8 areas of Japan during the period 1956–58. The purpose was to clarify the epidemiology of *Enterobius vermicularis* infection. The findings revealed an infection rate in children at kindergartens ranging from 20% to 49·2%, and in adults an average rate of 33·9% with a range from 15·1% to 59·6%. It is clear that climate and other geographical characteristics were not responsible for the differences found in the incidence.

As examinations were carried out in a variety of circumstances and environments it was possible to study epidemiological factors. No significant difference between the sexes was noted. The incidence was low up to 4 years of age and reached a maximum in the 5 to 9 age-group. Thereafter in most areas a second peak occurred between the ages of 30 and 50, probably due to infection of parents from their children. As might be expected, this second peak of incidence was at a younger age in women than in men, wives usually being younger than their husbands. Between the ages of 20 and 30 the infection rate was lowest in well-educated groups. Neither the size of income nor poverty of the environment was important, but reduction of bedroom space per person was clearly correlated with increased incidence. Studies of infection in families showed that the child, who was the main source of

infection, tended to acquire it at the kindergarten and to infect its mother who transmitted it to her husband. Habits of bathing, wearing of pyjama trousers and of underclothing did not influence the infection rate, but those who dressed children, washed their underclothes or handled bedding were specially likely to acquire the parasite.

Mass treatment cleared the worms from 87% of the general population as indicated by a single swab test, but from only 67·9% of kindergarten pupils. Repeated examination would have lowered these figures. The rate of reinfection during the 2 months after treatment was calculated to be 29·2%. On the basis of these findings it is suggested that an effective means of controlling *Enterobius* infection would be to treat the children aged 5 to 9 years at school.

T. H. Davey

BECK, J. W., SAAVEDRA, D., ANTELL, G. J. & TEJEIRO, B. **The Treatment of Pinworm Infections in Humans (Enterobiasis) with Pyrvinium Chloride and Pyrvinium Pamoate.** *Amer. J. Trop. Med. & Hyg.* 1959, May, v. 8, No. 3, 349–52.

The authors refer to the earlier work of WESTON *et al.* [this *Bulletin*, 1953, v. 50, 641], who reported activity of the cyanine dye, later known as pyrvinium chloride, against "pinworms" in laboratory animals, and that of ROYER (*Canadian Med. Ass. J.*, 1956, v. 74, 297), SAWITZ and KARPINSKI [this *Bulletin*, 1956, v. 53, 1470], and BUMBALO *et al.* [*ibid.*, 1958, v. 55, 1150], who obtained 100% efficacy against *Enterobius vermicularis* with this drug in man. In this paper the authors record results of their trials of pyrvinium chloride and of an improved form of it, pyrvinium pamoate, against infections of children with *E. vermicularis* in two Children's Homes in Florida. The paper includes a report, apparently received from Parke, Davis & Co., on the toxicity of pyrvinium chloride and pamoate to mice and rats when it was given orally.

There were children of both sexes in these trials. The children in one institution were all whites, while in the other institution there were both Negroes and whites. Infected families chosen more or less at random from the medical faculty and from among medical students were also studied.

Multiple doses of both pyrvinium chloride and pamoate were given and, because of the good results obtained with the pamoate, single doses of this were also tried. All doses were given orally, a raspberry-flavoured syrup being used, though some children received the drug in capsules.

The multiple doses of both the chloride and pamoate were 2 mgm./kgm. body weight divided into 3 doses daily for 7 days. The single dose of the pamoate was 5 mgm./kgm. body weight.

To discover children who were positive before treatment Scotch-tape examinations were done every morning before the child got up for 7 consecutive days; these examinations were continued on both treated and untreated patients during the 7 days of treatment in the multiple-dose trial and for 30 days thereafter. Thus Scotch-taping was attempted on all patients for 44 consecutive days. Negative controls, consisting of untreated and treated groups, and positive controls (untreated positives) were all examined by Scotch-tape for 44 consecutive days. Positive patients having the single dose were examined by Scotch-tape for 14 consecutive days after dosage.

The report on the toxicity of these drugs given orally to rats and mice states

that mice given 4, 6, 8 and 10 mgm./kgm. body weight of pyrvinium chloride suffered " depression " for an hour and then returned to normal, except that one mouse given 8 mgm. and 2 given 10 mgm. died. Mice given 50–125 mgm./kgm. body weight of the pamoate showed slight depression for up to an hour and then returned to normal and no further reactions were seen when doses up to 300 mgm./kgm. were given. Rats given 14 and 31 mgm./kgm. body weight orally daily of the chloride for 1 to 4 weeks showed moderate depression of food intake and severe depression of weight gain; and those given 198 mgm./kgm. body weight of the pamoate daily for 2 to 4 weeks showed similar reactions. None of the mice or rats showed significant blood changes.

Tables give the results obtained with the children. For treatment with pyrvinium chloride 196 children (71 Negroes, 125 whites) were examined for infection with *Enterobius vermicularis*: 77 (39·2%) were found infected, 71 of the whites (56·8%) and 6 (8·4%) of the Negroes being positive. Infections were chiefly in the 6–12-year age-group and were equally distributed between the sexes. Of the positive patients 63 were given pyrvinium chloride: 57 (90·4%) became negative during treatment and remained so, while 4 became negative within a week after treatment ended, and were all negative by the 9th day. Thus 61 of the 63 patients became negative. The presence of eggs in one case on the 24th and 27th day after treatment ended is explained as a " technical error " or a very early reinfection, because this patient had been previously negative for 23 days. Of 14 untreated positive patients 4 became spontaneously negative and remained so. Of 86 untreated negative controls 7 (8·1%) became positive before the study ended. Of 33 negative controls (17 white and 16 Negro) treated, none became positive. Re-examination, 4 months after this study, of 15 children in one of the Homes, 14 of whom had been present during the study, showed that 13 of the 14 were again positive, while one, previously negative, was still negative.

10 months later 34 children from the same Homes were given multiple doses of pyrvinium pamoate. 32 became negative during treatment and 26 were negative after 4 days of treatment. All were cured within the first week after treatment and remained negative. One child passed an *Ascaris lumbricoides* during treatment.

The single dose of the pamoate was given to 100 positive patients in the same Homes, as well as to families in the Medical School Faculty and to medical students. The day after the dose 45 of these were negative and remained so. The next day 62 were negative and by the 7th day after the dose 96 were negative. Of the 4 remaining positive in the second week after the dose, " two in each case showed only one egg per slide but once during this week ".

Children complained of the bitter taste of pyrvinium chloride and nausea and vomiting occurred; but the pamoate was taken without complaint and many children liked it.

The authors conclude that pyrvinium chloride and pamoate are comparable in curative value, both giving a cure rate of over 90% during 7 days of treatment, but that the pamoate is only about one-quarter as toxic to rats and mice. The cure rate of 96% achieved with a single dose of the pamoate is a marked advance over the multiple dosage over several days or weeks hitherto found necessary, and the single dose was popular among the mothers of the children. In view of the prevalence of this infection in institutions and in the

average family, periodic treatment might be considered and the single dose makes this feasible and may remove the public health and personal problem of enterobiasis. *G. Lapage*

CAGNOLATI, G. C. & MERIGHI, B. Reperto di larve di *Trichinella spiralis* (Owen, 1835) in una volpe catturata nella provincia di Roma. [**Larva of *Trichinella spiralis* in a Fox Captured in the Province of Rome**] *Parassitologia.* Rome. 1959, Apr., v. 1, No. 1, 78–9.

ZIMOROY, I. Y. [**Natural Trichinellosis Foci in Kursk Region**] *Med. Parasit. & Parasitic Dis.* Moscow. 1959, v. 28, No. 5, 586–9. [17 refs.] [In Russian.] English summary.

DEFICIENCY DISEASES

SALGANIK, R. I. **Nutrition in High Environmental Temperature. A Survey of the Literature.** *Amer. J. Clin. Nutrition.* 1959, Sept.–Oct., v. 7, No. 5, 599–607. [80 refs.]

J. NUTRITION. 1959, July, v. 68, Suppl. 2, pp. viii + 69, 7 figs & 1 map. [Numerous refs.] **A Nutrition Survey of the Armed Forces of Pakistan.**

The Punjab is traditionally the home of warriors. MCCARRISON frequently drew attention to the fine physique of Punjabi soldiers and associated this with their customary diet based on whole wheat and milk (*Nutrition and Health*, 1953, London: Faber & Faber). In World War II the Punjab regiments fully lived up to their reputation. In an after-dinner argument as to what country in the world produces the best infantrymen, a Punjabi officer could sensibly maintain claims for his men. During a week spent recently in the cantonments of Lahore, Rawalpindi and Peshawar, it was obvious to the abstracter that the fine physique and martial bearing of the men were unchanged since the creation of the state of Pakistan.

This report describes the work of a large team from the United States, who spent 3 months in Pakistan. During this period they measured the food intake for a period of one week in 9 service messes, they carried out a full clinical examination of 2,019 men and obtained from 496 others samples of blood in which they analysed 9 separate constituents. The general nutritional appearance of 98·1% of the men was recorded as good; their diet was also good and the intake of all nutrients up to acceptable physiological standards; the biochemical studies of the blood all fell within the ranges which would usually be considered normal in health. In fact, the results were exactly what any ordinary observer, equipped solely with a pair of eyes, would have predicted.

[One piece of information that is not presented in this report is the cost of the survey. This must have been great and this is relevant, for the authors state: "one very important function of the mission was to train Pakistani personnel in nutrition survey techniques". There must be some relation

between the cost of a scientific study and the value of its results. This survey will be of value only if it teaches the lesson that detailed clinical examinations of large groups of healthy young men and elaborate biochemical studies of their blood are a waste of time and money.] *R. Passmore*

HAUCK, Hazel M. & HANKS, Jane R., with the cooperation of Saovanee SUDSANEH. **Food Habits in a Siamese Village.** *J. Amer. Dietetic Ass.* 1959, Nov., v. 35, No. 11, 1143–8, 4 figs.

HAUCK, Hazel M. & SUDSANEH, Saovanee. **Food Intake and Nutritional Status in a Siamese Village.** *J. Amer. Dietetic Ass.* 1959, Nov., v. 35, No. 11, 1149–57, 3 figs. [17 refs.]

FERREIRA, A. P. & GÂNDARA, A. F. Contribuição para o estudo da nutrição na província de Macau. [**Nutrition in the Province of Macao**] *Anais Inst. Med. Trop.* Lisbon. 1958, Dec., v. 15, No. 4, 917–40. [14 refs.] English summary (9 lines).

This is one of 7 papers in this issue dealing with various conditions in the province of Macao, which includes not only the city itself but also the small islands of Taipa and Caloane where a study mission from the Institute of Tropical Medicine at Lisbon investigated conditions in April and May 1956.

To ascertain nutritional status 1,096 Chinese and 464 Macanese were examined clinically; some were examined by laboratory tests, especially of the blood and its components; and the diet of 100 families of both races was investigated and compared with FAO standards. Clinically an important feature of the serum proteins was the rise in alpha 2, beta and especially in gamma globulins, with the result that the A/G ratio was very much less than is normal in Europeans.

The average number of persons per family was 4·17. The monthly income [given in patacas, 1 P=apparently 1 Hongkong dollar ($1 HK)] was 75·6 but varied from $15 [about £1] (3 families) to over $200 (3 families). There was a deficiency of protein, especially animal protein, fats, and practically all vitamins. The poorest families ate no bread or animal proteins but only some rice and vegetables. Milk or eggs were rarely eaten by any of the 100 families. Comparison of these diets with those given to 216 persons in the Canossian Institute (a very well known charitable organization) showed that the latter were by far the better fed.

[A surprising feature is that in spite of such grossly deficient diets the haemoglobin varied between 10·96 and 15·9 gm.%.] *W. K. Dunscombe*

HIGGINSON, J. **The Definition of Kwashiorkor, Fatty Change, Necrosis, Cirrhosis and Cancer of the Liver.** Reprinted from *Acta Union Internat. Contre Cancer.* 1957, v. 13, Nos. 4/5, 525–39. [66 refs.] Discussion 539–42.

This, the opening paper of a symposium held in Kampala, Uganda, on primary carcinoma of the liver, is a general review of the connotation of terms

relevant to the subject. The terms "kwashiorkor", "pre-kwashiorkor" and kwashiorkor qualified by an adjective such as "mild", "severe", and "marasmic" are discussed clearly and concisely. The major source of controversy lies in whether or not the definition should include an aetiological connotation. The author favours the suggestion of BROCK (*Voeding*, 1955, v. 16, 169) to use the term "protein malnutrition" to cover all cases of this condition whether severe or sub-clinical, and to use the term kwashiorkor only for cases with the classical clinical picture. He recommends also usage of the general and non-specific term "infantile malnutrition," of which protein malnutrition should be regarded as a subdivision.

Other terms considered include "fatty change", "liver necrosis", "hepatitis", "cirrhosis", and "cancer of the liver". The criteria utilized by various authorities in the definition of cirrhosis are reviewed. It is suggested that MOON's concept (*Arch. Path.*, 1934, v. 18, 381) is the most satisfactory, describing cirrhosis as a chronic diffuse hepatitis, the essential features of which are (1) degeneration and destruction of liver cells; (2) regeneration of undamaged liver cells; and (3) proliferation of connective tissue. In the author's view, terms such as "nutritional" or "tropical" cirrhosis, "pigmentary", "granulomatous" and "parasitic" cirrhosis are to be used in general with great caution or better avoided.

Finally, a classification of epithelial tumours of the liver is recommended. It is emphasized that liver cell carcinoma and bile duct cell carcinoma be separated in all reports as representing distinct entities.

[Discussion following the paper is confined to consideration of the definition of kwashiorkor and emphasizes some of the difficulties involved in obtaining a uniform terminological approach.] *C. S. Leithead*

SCHENDEL, H. E. & HANSEN, J. D. L. **Studies of Amino Acid handling in Kwashiorkor with a possible Explanation for the Increased Amino-Aciduria.** *South African Med. J.* 1959, Oct. 17, v. 33, No. 42, 871–2.

"Renal function and other studies suggest that the increased amino-aciduria of kwashiorkor is due to altered utilization of absorbed amino acids causing the renal threshold to be exceeded. As yet, we have no evidence of a defect in renal tubular function."

CRAVIOTO, J., DE LA PENA, Carmen L. & BURGOS, G. **Fat Metabolism in Chronic, Severe Malnutrition: Lipoprotein in Children with Kwashiorkor.** *Metabolism.* New York. 1959, Sept., v. 8, No. 5, 722–30, 3 figs. [27 refs.]

The total lipids, the cholesterol and the lipoprotein fractions were measured in 15 children with kwashiorkor and changes during recovery recorded. Levels of all lipids rose promptly when the children received a good diet with ample protein and after 20–30 days on such a regime were usually 2 to 3 times the initial level. The authors point out that in the new-born there is a rapid rise in blood lipid levels and they suggest that the rises following treatment in kwashiorkor are part of the process of maturation, inherent in normal growth and development. *R. Passmore*

METZ, J. & STEIN, H. **Iron Deficiency Anaemia in Bantu Infants, and its Association with Kwashiorkor.** *South African Med. J.* 1959, July 25, v. 33, No. 30, 624–7, 3 figs.

There is but scanty reference to iron deficiency in kwashiorkor in South African Bantu children. Cases are encountered however at Baragwanath Hospital in Johannesburg, the diagnosis depending on a haemoglobin of under 10 gm.% and a mean corpuscular haemoglobin concentration (MCHC) of under 30%. Most of the children so affected suffer from some form of infection, but the 60 patients studied here included only those with very brief or no infection. They ranged from 3 months to 3½ years of age, most being aged 6 to 18 months. Only 4 were breast-fed, 10 were taking maize porridge only, and 46 took maize porridge plus supplements. An enquiry among 300 mothers attending the hospital showed that none of them used iron cooking pots. The maize feeds provided only 2·1 to 4·5 mgm. of Fe per day.

Serum iron in 35 children was low, exceeding 100 μgm./100 ml. only in 3. Oral iron administration was followed by a negligible reticulocytosis, and very little haematological improvement. Intramuscular iron however was fully effective. The poor absorption of oral iron was ascribed to hypochlorhydria, lack of vitamin C, and the frequent presence of diarrhoea. *Alan B. Raper*

FOMON, S. J. **Comparative Study of Human Milk and a Soya Bean Formula in promoting Growth and Nitrogen Retention by Infants.** *Pediatrics.* Springfield, Ill. 1959, Oct., v. 24, No. 4, 577–84, 3 figs. [15 refs.]

"Four infants, 4 to 6½ months of age, were studied for periods of 38 to 73 days while receiving ad libitum feeding of a formula in which the protein was derived from soya bean. No other source of calories was provided. The content of protein in the formula was 1·14gm/100 ml (6·8% of the calories supplied by protein) and the mean intake of protein by the infants was 1·7 gm/kg/day. The amounts of methionine (mean intake, 38 mg/kg/day) and tryptophan (mean intake, 14 mg/kg/day) supplied by the formula were slightly less than currently accepted minimal requirements for infants.

"The rate of gain in weight of the infants was normal and retentions of nitrogen (15 metabolic balance studies) were at least as great as those of normal full-term infants of similar ages fed human milk. This finding may be of value in consideration of protein allowances for children in technically underdeveloped areas of the world in which soya beans, but not animal protein, are available."

[See also this *Bulletin*, 1959, v. 56, 349.]

KRISHNAMURTHY, K., RAMAKRISHNAN, T. N., GANAPATHY, S. N., RAJAGOPALAN, R., SWAMINATHAN, M., SANKARAN, A. N. & SUBRAHMANYAN, V. **The Nutritive Value of Composite Protein Foods based on Blends of Groundnut, Soyabean, Bengal Gram and Sesame Flours.** *Ann. Biochem. & Exper. Med.* Calcutta. 1959, June, v. 19, No. 6, 139–46. [14 refs.]

SUBRAHMANYAN, V., DORAISWAMY, T. R., BHAGAVAN, R. K., TASKER, P. K., SANKARAN, A. N., RAJAGOPALAN, R. & SWAMINATHAN, M. **Supplementary Value of a Protein Food based on a Blend of Coconut Meal, Groundnut Flour and Bengal Gram Flour to the Diet of Children.** *Ann. Biochem. & Exper. Med.* Calcutta. 1959, June, v. 19, No. 6, 147–52. [16 refs.]

"1. A feeding experiment extending over a period of 8 months was carried out on forty boys aged 7–12 years in a boarding home in Mysore to assess the value of supplementing their diet with 56·8 g. daily of multipurpose food composed of groundnut flour, coconut meal and Bengal gram flour and fortified with certain vitamins and calcium phosphate.

"2. The children were paired according to initial height and weight and the members of each pair allotted at random to the control and experimental groups. Values for weight, height, nutritional status, haemoglobin level and red-cell count were obtained at the beginning and end of the experiment for the subjects in the two groups.

"3. The increases in height, weight, red-cell count and haemoglobin levels of the subjects in the experimental group receiving the supplement, were significantly higher than those obtained for the control group. Fourteen out of twenty children in the experimental group improved in their nutritional status whereas none in the control group showed any improvement. On the other hand, three children in the control group showed deterioration and the remaining were stationary."

[See this *Bulletin*, 1958, v. 55, 678.]

TASKER, P. K., NARAYANA RAO, M., SWAMINATHAN, M. & SUBRAHMANYAN, V. **The Effect of Supplementary Protein Food containing Coconut Meal, Groundnut and Bengal Gram Flours on the Metabolism of Nitrogen, Calcium and Phosphorus in Children subsisting on a Poor Rice Diet.** *Ann. Biochem. & Exper. Med.* Calcutta. 1959, June, v. 19, No. 6, 153–8.

"1. The metabolism of nitrogen, calcium and phosphorus was studied during 5 days in six pairs of boys aged 10–12 years, similar in age, height and weight and fed on a diet based on rice or on the same diet supplemented daily with 56·8 g. of protein food consisting of a blend of low fat coconut meal, groundnut flour and Bengal gram flour fortified with calcium phosphate and certain vitamins.

"2. The mean daily nitrogen intakes on the rice diet and rice-protein food diet were 6·73 g. and 9·94 g. respectively. All the children in the two groups maintained positive nitrogen balance. The daily nitrogen retention on the rice-protein food diet (2·12 g.) was significantly higher ($P<0·05$) than that on the rice diet (1·37 g.).

"3. The mean daily intakes of calcium on the rice diet and rice-protein food diet were 613 mg. and 853 mg. respectively. All the subjects in the two groups were in positive calcium balance. The daily retention of calcium in the subjects on the rice-protein food diet (355 mg.) was significantly higher ($P<0·05$) than that observed on the rice diet (255 mg.).

"4. The mean daily intakes of phosphorus on the rice diet and rice-protein food diet were 1144 mg. and 1483 mg. respectively. All the subjects in the two

groups were in positive phosphorus balance. The daily retention of phosphorus on the rice-protein food diet (538 mg.) was significantly higher than that observed on the rice diet (434 mg.)."

GOYCO, J. A., with the technical assistance of Carmen L. SANTIAGO & Eliseo RIVERA. **Nitrogen Balance of Young Adults consuming a Deficient Diet supplemented with Torula Yeast and other Nitrogenous Products.** *J. Nutrition.* 1959, Sept., v. 69, No. 1, 49–57. [22 refs.]

See also p. 183, HIGGINSON, **Pathogenesis of Liver Cancer in the Johannesburg Area. (South Africa). Part I.**

PEYROT, J. P. Tachycardie supérieure à 200 au cours d'un béri-béri cardiaque aigu. [**Tachycardia exceeding 200 Beats per Minute during Acute Cardiac Beriberi**] *Méd. Trop.* Marseilles. 1959, Sept.–Oct., v. 19, No. 5, 507–10.

Report of a case.

SPRUE

CROSBY, W. H. [Editor.] **Tropical Sprue. Studies of the U.S. Army's Sprue Team in Puerto Rico.** pp. vii + 355, numerous figs. [Numerous refs.] 1959. Med. Sci. Publication No. 5. Wash. 12: Walter Reed Army Institute of Research, Walter Reed Army Medical Center. [Obtainable from U.S. Govt. Printing Office, Wash. ($1.75.)]

These studies were initiated at a conference at the Walter Reed Army Institute of Research at Washington D.C. in July 1953. A panel of 12 men, army and civilian—including eventually one from Canada and another from Britain—met to discuss a moderately long-term investigation of the sprue syndrome, in particular of the pathogenesis of its nutritional defects. Arrangements were there made for work at the Tropical Research Medical Laboratory, San Juan, Puerto Rico, where it was hoped patients with sprue would be available. The Puerto Rico Department of Health arranged for the cooperation of medical specialists conversant with the disease, and for laboratory and other accommodations. In March 1955, and annually to date (1958), the panel has again met to coordinate their activities and findings. The minutes of these 5 conferences occupy the first chapter of 92 pages which are by no means the least valuable part of this report.

Most of the other 24 chapters are reprinted reports; their collection here is helpful in obviating search for inaccessible publications. Colonel W. H. CROSBY [*Sprue in Puerto Rico*, pp. 93–96] indicates the Army's particular interest in defective metabolism and absorption, which occur in severe battle casualties and in patients with an intestinal flora altered by antibiotic treatment. When ASHFORD, and CASTLE and RHODES early in the century were in Puerto Rico 20% of deaths there were due to anaemia, chiefly caused by hookworm disease; sprue patients usually had a megaloblastic macrocytic anaemia; so much of the pioneer work on sprue in Puerto Rico was undertaken by haematologists. Correction of the macrocytic anaemia, leucopenia, and megaloblastic bone

marrow in sprue benefits the patient even though malabsorption persists; the physiology of absorption of red-cell maturation factors interests both gastroenterologists and haematologists; it is not certain whether malabsorption is fundamental or only incidental in sprue.

Enrique PEREZ-SANTIAGO and C. E. BUTTERWORTH, Jr. [pp. 97–105] on the *Definition and Diagnosis of Sprue* record clinical and laboratory findings in 79 cases of sprue. Diarrhoea, glossitis and a megaloblastic marrow with malabsorption of at least 2 of the test substances (xylose, vitamin A, and fat) must be established to vindicate the diagnosis. Malabsorption and a megaloblastic marrow suggest tropical sprue—in contradistinction to other forms of the syndrome refractory to treatment. F. H. GARDNER [pp. 107–132; see also this *Bulletin*, 1957, v. 54, 334] describes a malabsorption syndrome in 21 military personnel stationed in Puerto Rico; its characteristics were dyspepsia and diarrhoea, loss of weight, and lassitude, but not anaemia or gross steatorrhoea; this condition responded to folic acid treatment. It was the "incomplete sprue" of earlier workers.

At a panel on *The Treatment of Sprue* [pp. 133–141] after a review by W. DAMESHEK, G. GARCÍA-LÓPEZ considered sprue syndromes throughout the world to be essentially the same, variations being local. Complete cure follows treatment if there is no neurological involvement. Adjuvants are a high protein low fat and carbohydrate diet, rest, and in selected cases steroid therapy. F. GARDNER agreed that folic acid is the treatment of choice; in early cases dietary control is needless. The well-developed macrocytic anaemia is relieved by vitamin B12; but long-standing intestinal malabsorption may cause irreversible changes in bowel function; dietary control is then necessary to lessen diarrhoea. This persistent malabsorption suggests more a general metabolic dysfunction than a pure nutritional deficiency. Tom D. SPIES said that folic acid, vitamin B12 or related compounds are so indiscriminately used and so effective in sprue, in both Puerto Rico and Cuba, that the untreated new patient is hard to find. All theories as to the causation of sprue are tentative and contestable; the disease should be considered as one affecting the whole body, not solely the bowel or blood-forming systems. Tropical sprue seems to be a deficiency disease which like nutritional macrocytic anaemia responds dramatically to folic acid; idiopathic steatorrhoea is both difficult to treat and often fatal. In idiopathic steatorrhoea the primary defect is due in part to failure of certain digestive enzymes; these are normal in the other 2 conditions, where the fault lies in absorption. Radiological, haematological and biochemical defects in sprue are corrected by treatment with any of the drugs mentioned. If the patient thereafter is maintained on a nutritionally-adequate diet usually they do not recur. Steroid therapy, though it gives symptomatic relief, is not an alternative to these. A diet rich in animal protein, in minerals and vitamins must be maintained for life after successful drug treatment. R. W. VILTER agreed that sprue starts as a result of deficiencies of folic acid and of vitamin B12 and possibly of other factors; these result in malabsorption and in many secondary deficiency states. Folic acid is the drug of choice in treatment, vitamin B12 an alternative; a high protein, low fat and low fermentable carbohydrate diet is helpful. Initial supplements of vitamins, of iron and of other deficient nutrients are necessary. Normal health is maintained in early cases by continuation on adequate diet alone; in advanced cases folic acid maintenance (5 mgm. daily) is also necessary.

C. E. Butterworth, Jr. and E. Perez-Santiago [pp. 143–145 ; see *ibid.*, 1957, v. 54, 205] found injections of Thymidine not to produce haematological improvement in relapse cases of tropical sprue. F. H. Gardner [pp. 147–174] in *Medical Progress* reviews the findings of the team in Puerto Rico. Prolonged depletion of some undetermined nutrients leads to changes in the mucosa of the small intestine. With careful dietary control sprue may remit permanently [*vide* an opinion expressed earlier [p. 94] that sprue patients " never die and never get well "]. Why treatment with folic acid is so effective is not clear. Changes in the blood-forming and epithelial tissues follow progressive depletion of body stores of vitamins ; the changes in the bowel epithelium may ultimately become irreversible. Treated sprue patients who have recovered from the macrocytic anaemia have a malabsorption syndrome closely similar to that seen in non-tropical sprue, but calcium and vitamin K deficient absorptions are rare. There is an extensive and valuable bibliography.

F. H. Gardner [pp. 175–187 ; see also *ibid.*, 1956, v. 53, 1264] records the *Observations on the Cytology of Gastric Epithelium in Tropical Sprue* made on specimens collected by a rotating brush ; changes in the cells akin to those found in Addisonian anaemia were found without achlorhydria ; these may persist after adequate anti-anaemic treatment. C. E. Butterworth, Jr. and E. Perez-Santiago [pp. 189–215 ; see also *ibid.*, 1958, v. 55, 1039] describe *Pathologic Changes in Jejunal Biopsies from Sprue Patients* on specimens taken from 6 patients during laparotomies for other reasons ; 15 control specimens were available. The sprue patients showed oedema and inflammation with widening of the villi ; in 5 there was inflammatory infiltration of the columnar epithelium. Rapid cell renewal is normal in the intestinal epithelium ; possibly, diminished regeneration or shortened survival of the columnar cells may cause faults in the integrity of the surface which lead to the changes observed.

W. H. Crosby and H. W. Kugler [pp. 217–222] did *Intraluminal Biopsy of the Small Intestine* with " The Intestinal Biopsy Capsule ". This ingenious device is a steel cylinder with a 5 mm. port, swept by a previously cocked rotating knife blade. It is controlled by polythene tubing after being swallowed. Suction draws mucosa into the port ; the spring-operated knife snips it off with an audible click. There is an X-ray picture showing the capsule 8 feet from a patient's lips. C. E. Butterworth, Jr., R. B. W. Smith and E. Perez-Santiago [pp. 223–238] describe the *Pathological Findings in Jejunal Specimens obtained by Peroral Intubation Biopsy in Patients with Malabsorption* on specimens which were taken with the above instrument from 16 patients ; 9 had active sprue. In all there was inflammation with marked widening of the villi, flattening, inflammation and vacuolation of the columnar epithelium, and paucity of columnar cells. Changes in the villi were less in the effectively treated ; the columnar cells also were less flattened but there were persisting inflammation and oedema of the columnar layer. Changes in the columnar epithelium seem to be early and persistent defects in patients with tropical sprue ; they were only minimal in patients with idiopathic steatorrhoea.

R. E. Hartman, R. B. W. Smith, Roberta S. Hartman, C. E. Butterworth, Jr. and J. M. Molesworth [pp. 239–242] undertook *Electron Microscopy of Human Intestinal Epithelium obtained with the Crosby Intestinal Biopsy Capsule* and found the method of biopsy effective. Together with W. H.

CROSBY [pp. 243–254] they record *Preliminary Findings of an Electron-Microscopic Investigation of the Cytopathology of the Jejunal Epithelium in Sprue* on specimens obtained with it from 5 patients with tropical sprue and one with idiopathic steatorrhoea. They found a picture largely conforming to that seen in stained paraffin sections, except that in 2 patients with untreated sprue large areas of the villi were devoid of epithelium—this had been noted in the sections but had been dismissed as artefact. Changes in the morphology of the villi in their untreated sprue patients they estimate to reduce the surface epithelium of the affected bowel to 20% of its normal; this may explain failure of absorption.

F. H. GARDNER and C. ROMERO [pp. 255–259; see also *ibid.*, 1956, v. 53, 795] record *A Preliminary Study of Small Bowel Mucoproteins in Tropical Sprue.* H. NADEL and F. H. GARDNER [pp. 261–264; see also *ibid.*, 1956, v. 53, 1475] undertook a *Bacteriological Assay of Small Bowel Secretion in Tropical Sprue.* F. H. GARDNER and E. PEREZ-SANTIAGO [pp. 265–276] examine *Oral Absorption Tolerance Tests in Tropical Sprue*, before and after treatment, using D-xylose, butter fat and vitamin A. Absorption was poor before therapy; it improved only minimally after it in spite of good haematological responses; this suggests a non-reversible malabsorption defect in sprue. C. E. BUTTERWORTH, Jr., E. PEREZ-SANTIAGO, J. MARTINEZ-DE JESUS and R. SANTINI [pp. 277–291] pursued *Studies on the Oral and Parenteral Administration of D (+) Xylose* in dogs, rats and man. The test proved to be simple, accurate and informative; patients with active sprue consistently had a low urinary xylose excretion when given the compound orally; given intravenously it was excreted normally—indicating malabsorption. R. SANTINI, J. MARTINEZ-DE JESUS, C. E. BUTTERWORTH, Jr. and E. PEREZ-SANTIAGO [pp. 293–298] produced *Evidence of Increased Intestinal Absorption of Molecular Sucrose in Sprue,* using this sugar because it is not catabolized on entering the blood stream and is excreted in the urine. Urines of normal persons given sucrose orally are free of it after a 10-hour fast; excretion continues for 24 hours in sprue patients. Lessened hydrolysis of sucrose and increased intestinal permeability may be factors in this.

C. E. BUTTERWORTH, Jr. and E. PEREZ-SANTIAGO [pp. 299–306] did *An Evaluation of the Use of Radioactive Iodotriolein to estimate the Absorption of Fat from the Intestine*; they found it to offer no advantages over chemical methods of determination. C. E. BUTTERWORTH, Jr., H. NADEL, E. PEREZ-SANTIAGO, R. SANTINI and F. H. GARDNER [pp. 307–319; see also *ibid.*, 1958, v. 55, 1038] examined *Folic Acid Absorption, Excretion, and Leukocyte Concentration in Tropical Sprue.* They found marked malabsorption during active sprue with reduced tissue levels resultant on the intestinal dysfunction; this is not a specific defect or peculiar to sprue, as is the vitamin B12 malabsorption of pernicious anaemia. R. SANTINI [pp. 321–323] briefly records a method of *Determination of Serine in Plasma.* C. E. BUTTERWORTH, Jr., R. SANTINI and E. PEREZ-SANTIAGO [pp. 325–338; and see *ibid.*, 1958, v. 55, 564] report on *The Absorption of Glycine and its Conversion to Serine in Patients with Sprue*, finding that absorption is delayed but conversion unchanged in untreated sprue patients. C. E. BUTTERWORTH, Jr., R. SANTINI and E. PEREZ-SANTIAGO [pp. 339–350] enlarge on *Certain Aspects of Glycine and Histidine Metabolism in Patients with Sprue*, suggesting that folic acid may have a "pharmacologic" effect in certain forms of megaloblastic anaemia. Finally,

C. E. Butterworth, Jr., C. J. Gubler, C. G. Cartwright and M. M. Wintrobe [pp. 351–355] determined the *Plasma Copper in Patients with Tropical Sprue*; they found it to be low during the active disease, probably because of inability to synthesize the protein portion of ceruloplasmin, and possibly in part in some patients to malabsorption of copper.

[This volume must be of the greatest interest to those working on sprue, and is a record of work of considerable value.] *A. R. D. Adams*

Lima Gómez, O., Wuani E., H. & Beker, S. Esprue tropical en Venezuela. (A propósito de 11 observaciones.) [**Tropical Sprue in Venezuela**] *Archivos Venezolanos de Patol. Trop. y Parasit. Méd.* 1959, July, v. 3, No. 1, 1–42, 8 figs. [11 refs.] English summary.

An account of 11 cases.

Miranda G., M. Síndrome de malabsorción, con especial referencia al sprue tropical, sprue no tropical y enfermedad celíaca. [**The Malabsorption Syndrome, with Special Reference to Tropical Sprue, Non-Tropical Sprue and Coeliac Disease**] *Acta Méd. Costarricense.* 1957, Dec., v. 1, No. 1, 37–56. [62 refs.] English summary.

A general review and discussion.

HAEMATOLOGY

Greig, H. B. W. **Hypochromic Anaemia in South Africa: a Study of the Incidence in the Transvaal 1955–56.** *South African Med. J.* 1959, Oct. 17, v. 33, No. 42, 869–71, 1 fig. [15 refs.]

This is an analysis of the records of a central haematological laboratory and its subsidiaries for one year (1955–56). From such a source the epidemiological data that it is fruitful to examine are limited, but certain comparisons may be made. Hypochromic anaemias formed about the same proportion of all anaemias in the Bantu as they did in the white people, the figures being 16·4% and 13·1% respectively. Moreover, the figures for the severity of the hypochromic anaemias at initial diagnosis were much the same in the two races. So far as causation could be ascertained, blood loss was the commonest factor in white males, and infections in Bantu males. This paper adds to the evidence that hypochromic anaemia is by no means rare in the South African Bantu. *Alan B. Raper*

See also p. 167, Metz & Stein, **Iron Deficiency Anaemia in Bantu Infants, and its Association with Kwashiorkor.**

NEEB, H. & HARMS, H. Ferriprive anemie bij de Papoea's, gezien als volksdeficiëntieziekte. **[Iron-Deficient Anaemias in Papuan Children as an Endemic Deficiency Disorder]** *Nederl. Tijdschr. v. Geneesk.* 1959, Oct. 24, v. 103, No. 43, 2159–61, 1 fig.

The English summary appended to the paper is as follows:—

"The iron-deficient anaemias frequently seen in Papua children are a continuation of similar deficiencies in their mothers. In growing children this deficiency becomes relatively greater owing to insufficient supplementation from their food, resulting in a more severe form of anaemia. A high protein diet, including e.g. skim milk, will not by itself cure the anaemia. Only iron medication will cause a rapid and marked rise of the haemoglobin level.

"The distribution of skim milk to pregnant women and school children by the Maternal and Child Health Service—assisted here, as in other tropical countries, by UNICEF—should be supplemented by liberal quantities of a suitable iron preparation."

REYNAUD, R. Manifestations pathologiques liées au trait drépanocytaire. **[Pathological Manifestations associated with the Sickle-Cell Trait]** *Méd. Trop.* Marseilles. 1959, Sept.–Oct., v. 19, No. 5, 542–9. [19 refs.]

KHANDELWAL, M. K. & SOLANKI, B. R. **Thalassemia Major as observed in Nagpur.** *Indian J. Child Health.* 1959, Sept., v. 8, No. 9, 487–97, 6 figs. [13 refs.]

The increasing recognition of thalassaemia in India underlies this report of 13 cases of the major form of the disease in children aged between 5 months and 5 years. The authors also mention having seen combinations of thalassaemia with the traits for Hb S and Hb D. The diagnoses were well supported by pathological investigations, which, together with the clinical features, were quite typical. Details are given of observations on 10 pairs of parents which, as far as they go, are consistent with a diagnosis of thalassaemia minor in every one. *Alan B. Raper*

SWARUP, S., GHOSH, S. K., KUNDU, H. B. & CHATTERJEA, J. B. **Abnormal Haemoglobins in Mysore.** *J. Indian Med. Ass.* 1959, Sept. 16, v. 33, No. 6, 209–10. [14 refs.]

"This communication is presented to record the presence of haemoglobins S and D amongst the people of the Shimoga district in the state of Mysore [one of each in 550 subjects]."

VELLA, F. **Abnormal Haemoglobins in Indians in Singapore with Two Instances of Haemoglobin L.** *J. Indian Med. Ass.* 1959, Sept. 16, v. 33, No. 6, 207–9. [26 refs.]

A previously reported survey of Hb types has now been extended to cover 2,500 Indian subjects in Singapore, the study including 222 samples of blood

from new-born infants. Abnormal variants, all in conjunction with Hb A, were found as follows: Hb D, 13 samples (0·52%); Hb E, 8 samples; Hb J, 1 sample; Hb K, several samples from 4 different families; Hb L, 2 samples.

In 2 specimens of cord blood, a fast-moving component was detected, corresponding with that described by FESSAS and PAPASPYROU [this *Bulletin*, 1958, v. 55, 444]. It is remarked that among 1,962 Chinese new-born children examined at the same time, 63 showed this abnormal component.

Alan B. Raper

HUNT, J. A.; INGRAM, V. M.; LEHMANN, H. **Abnormal Human Haemoglobins. Human Haemoglobin E.: the Chemical Effect of Gene Mutation** [HUNT & INGRAM]. *Nature*. 1959, Sept. 19, v. 184, 870–72, 1 fig. [18 refs.] **Haemoglobin 'Bart's': a Foetal Haemoglobin without α-Chains** [HUNT & LEHMANN]. *Ibid.*, 872–3, 2 figs.

VENOMS AND ANTIVENENES

KNYVETT, A. F. & MOLPHY, Ruth. **Respiratory Paralysis due to Snake-Bite: Report of Two Cases.** *Med. J. Australia*. 1959, Oct. 3, v. 2, No. 14, 481–4.

RAMSEY, H. W. & GENNARO, J. F., Jr. **An Analysis of the Toxicity and Hemolytic Properties of Stored Desiccated Venoms of Two Crotalidae.** *Amer. J. Trop. Med. & Hyg.* 1959, Sept., v. 8, No. 5, 552–6, 5 figs.

"The toxicity, hemolytic properties, and UV absorption spectra of dried *Crotalus adamanteus* and *Ancistrodon p. piscivorus* venoms stored over a period of 13 years were determined.

"It was found that the toxicity of the venoms remained essentially unaltered, although hemolytic properties of the older venoms were slightly reduced. Absorption spectra of these venoms revealed noticeable differences which were correlated with the age of the venoms."

GENNARO, J. F., Jr. & RAMSEY, H. W. **The Toxicity of Some Precipitated Fractions of Dried Moccasin Venom** (*Ancistrodon piscivorus piscivorus*). *Amer. J. Trop. Med. & Hyg.* 1959, Sept., v. 8, No. 5, 546–51, 5 figs. [12 refs.]

GENNARO, J. F., Jr. & RAMSEY, H. W. **Distribution in the Mouse of Lethal and Sub-Lethal Doses of Cottonmouth Moccasin Venom labelled with Iodine–131.** [Correspondence.] *Nature*. 1959, Oct. 17, v. 184, Suppl. No. 16, 1244–5, 2 figs.

MITSUHASHI, S., MAENO, H., KAWAKAMI, M., HASHIMOTO, H., SAWAI, Y., MIYAZAKI, S., MAKINO, M., KOBAYASHI, M., OKONOGI, T. & YAMAGUCHI, K. **Studies on *Habu* Snake Venom. 1. Comparison of Several Biological Activities of Fresh and Dried *Habu* Snake Venom.** *Japanese J. Microbiol.* 1959, Jan., v. 3, No. 1, 95–103, 1 fig. [32 refs.]

See this *Bulletin*, 1946, v. 43, 669.

CENTRAL AFRICAN J. OF MED. 1959, Aug., v. 5, No. 8, 429–30. **The Rhodesian Bee.** [Editorial.]

Authoritative detailed information on the hazards from bees is not widely found in medical literature, but situations may arise suddenly where it is urgently required [the present abstracter writes with painful memories of an alarming experience in tropical Africa]. While this admirable editorial [stated to be based on information obtained from Dr. C. E. R. PAYNE] deals with the Rhodesian bee, it is of practical value to potential victims elsewhere.

Bees may be vicious even after several years of captivity: the commonest cause is the accidental leaving of honey in the neighbourhood. They cannot tolerate certain smells, such as sweat, blood, manure, onions, paraffin, petrol or DDT, and the accidental proximity of such sources may enrage a hitherto docile colony. A displaced colony is likely to find its way to certain attractive places such as houses near good honey-trees (*e.g.* blue gums). A box smeared inside with old wax and placed on the roof may divert the bees and may be removed if they become a nuisance, but another swarm will probably take their place under the roof unless all the wax is scraped off and the surface painted with bituminous paint.

There seems to be a seasonal movement of bees which may move from holes in the ground to trees at the onset of the rains and return in the hot weather. On the whole, a moving or recently settled swarm is comparatively docile: during active clustering they are preoccupied, and for a few days in their new residence while starting comb formation they may be handled with relative impunity: but once eggs have been laid and hatched and honey is being collected, they will become resentful of interference and vicious.

Bees on a metal surface such as corrugated iron, may find that their combs have melted and fallen down in the hot weather and then " there is indescribable chaos ". In such situations they should be removed or destroyed lest the heat may produce conditions in later years of their residence there which would cause them to be a potential danger to neighbouring human beings or livestock.

Experts can remove bees effectively with liquid carbon disulphide, but this is dangerous in inexperienced hands. Persons known to be allergic to bees should avoid risk of exposure: many fatalities have followed failure to observe this rule. Where possible, desensitization should be carried out: a person may suddenly become sensitive after years of experiencing unlimited stings without mishap, while another may succumb to a single sting.

Bee collectors should wear thick protective clothing—at least 3 layers, such as a thick white boiler suit, thick coat and shirt. Loose cotton netting is useless and dangerous. Two pairs of thick rubber or leather gloves may be necessary—autopsy gloves are inadequate. Copper mosquito gauze over the head and face should be so affixed to a stiff hat to prevent the gauze from touching the face. Socks are pulled over trouser-ends which are tucked into old mosquito boots.

A hive should be entered after dark, as attack is unlikely at that time: but where an attack is impending it is best to run, making for a dark place, or to get into a closed car, rather than simply to throw oneself on the ground. If possible, spraying with a garden hose or the generation of smoke should be attempted.

Stings should not be removed by use of the finger and thumb, as this squeezes the poison sac and injects more venom. The sharp edge of a knife parallel to the skin should be slid along and the sting scraped out. The best after-treatment is a large dab of tincture of iodine over and around the site. Antihistamines may be taken by the mouth. *H. J. O'D. Burke-Gaffney*

TOXOPLASMOSIS

LAPEYSSONNIE, L. Toxoplasmoses et toxoplasme. Notions actuelles de pathologie, de biologie et d'épidémiologie. [**Current Knowledge of the Pathology, Biology and Epidemiology of Toxoplasmosis and Toxoplasms**] *Méd. Trop.* Marseilles. 1959, Sept.–Oct., v. 19, No. 5, 515–36, 2 figs. [Numerous refs.]

MEIRA, J. A., AMATO NETO, V., NOBREGA, P. & TRAPP, E. E. Resultados de reações sorológicas para o diagnóstico da toxoplasmose efetuadas com o sôro de pacientes com protozooses. [**Results of Serological Tests for Toxoplasmosis on Sera from Patients with Protozoal Diseases**] Reprinted from *Hospital*. Rio de Janeiro. 1959, May, v. 55, No. 5, 641–8.

The English summary appended to the paper is as follows:—

"To test the possibility that some protozooses might be responsible for false positive results of the Sabin-Feldman test for toxoplasmosis, the authors performed this test in sera from 93 patients with mucocutaneous leishmaniasis, Chagas' disease (acute and chronic cases), malaria, kala-azar, intestinal amebiasis and balantidiasis. In some cases, the complement fixation test for toxoplasmosis was made in addition. The results obtained were identical with those found in normal subjects. The authors emphasize that the titers found cannot be confused with those obtained from known toxoplasmosis cases. On actual practice, there is no danger of such interference."

[See CATHIE, this *Bulletin*, 1957, v. 54, 1121.]

SAXÉN, E., SAXÉN, L. & GRÖNROOS, P. **Glandular Toxoplasmosis. A Report on 23 Histologically Diagnosed Cases.** *Acta Path. et Microb. Scandinavica.* 1958, v. 44, No. 4, 319–28, 4 figs. [23 refs.]

Only a few cases of glandular toxoplasmosis have been described since the first published report in 1950, while the identification of the toxoplasmal pseudocysts in glandular tissue has been achieved once only. The diagnostic histological changes are described as follows:—"In addition to follicular hyperplasia and sinus catarrh, the lymph nodes exhibited numerous enlarged epitheloid-like cells, either solitary or in small groups, which were sometimes situated in Flemming's centres, but mostly in the medullary portion. Rather large mononuclear cells were also encountered, which had a hyperchromatic irregular nucleus with indistinct borders and no observable nuclear structure.

Another characteristic feature in the histological picture was the abundant occurrence of histiocytes and mitoses in Flemming's centres. The histiocytes contained nuclear debris in abundance. No necroses, giant cells or fibrosis were detected".

The specimens recognized as examples of toxoplasmosis were found among a large number of glands removed at biopsy from patients of all ages and both sexes living throughout Finland. The diagnosis in each case was confirmed by positive complement-fixation and Sabin-Feldman dye tests carried out on the serum. By charting the titre obtained in the dye test against the duration of the glandular swellings, the authors have shown that a diagnostic titre of 1 in 64 or above is found after 2 weeks, while after 4 weeks most patients showed a titre of 4096 or above. There was very good correlation between the results of complement-fixation and dye tests.

One striking finding was that women outnumbered men by 22 to 1, though the sexes were equally distributed in the material examined. The age distribution ranged from 13–57 years.

A few clinical observations are reported. Slight pyrexia was observed in 6 patients but none developed eye signs or skin changes. The erythrocyte sedimentation rate was usually low, from 4 to 25 mm. in 1 hour and the leucocyte count was within normal limits. The condition appears to be benign, for the glands subsided in each of the 22 patients who could be traced.

Conclusions as to the source of infection could not be drawn, but it is of significance that in the majority of patients symptoms began in the coldest months of the year. A similar seasonal incidence in hares has been noted in Denmark [this *Bulletin*, 1951, v. 48, 1150].

The authors conclude that the glandular form of toxoplasmosis is a disease lacking in signs of clinical significance and therefore must often be undiagnosed though its predilection for women of child-bearing age should be noted in connexion with the possibility of congenital transmission. An early diagnosis can be made with confidence on the histological changes to be seen in excised glandular tissue. *J. H. Walters*

NIEDMANN, G., THIERMANN, Erica & DEL CAMPO, E. Un caso de miocarditis crónica toxoplasmósica. [**A Case of Chronic Myocarditis due to Toxoplasmosis**] *Bol. Chileno de Parasit.* 1959, July–Sept., v. 14, No. 3, 59–61. [20 refs.]

The English summary appended to the paper is as follows:—

"The authors report the clinical case of a 46 year-old woman with chronic heart failure manifestations due to myocarditis. All common etiologies of myocarditis were excluded by means of clinical and laboratory tests and the possibility of a toxoplasmic myocarditis was contemplated on account of positive serologic tests for toxoplasmosis at high titers. Several clinical aspects of the latter disease are also discussed in connection with the present case."

DERMATOLOGY AND FUNGUS DISEASES

STERNBERG, T. H. & NEWCOMER, V. D. **Modern Dermatologic Therapy.**

This book was reviewed on p. 92.

SCHENONE, H. Dermatitis pruriginosa producida por el ácaro *Dermanyssus gallinae* (De Geer, 1778). [**Pruriginous Dermatitis caused by the Mite** *Dermanyssus gallinae* **(De Geer, 1778)**] *Bol. Chileno de Parasit.* 1959, July–Sept., v. 14, No. 3, 57–8, 1 fig.

The English summary appended to the paper is as follows:—

" Accidental parasitism in humans by *Dermanyssus gallinae*, a mite commonly found in different species of birds (chickens, canaries, pigeons, etc.) may result in severe dermatitis. Eleven patients were recently observed in the out-patient clinic of the Department of Parasitology; they had pruritus as the main symptom, often associated with a reddish papular eruption. Treatment with 0·4% Gammexane emulsion was successful in all patients.

" This etiology should be considered in cases of dermatitis in which no other obvious etiological factor is present, especially in outbreaks affecting family groups during Summer and Autumn months."

[See this *Bulletin*, 1959, v. 56, 779.]

FURTADO, T. A. **Histopathology of Pemphigus Foliaceus.** *Arch. Dermat.* 1959, July, v. 80, No. 1, 66–71, 3 figs. [38 refs.]

In Brazil pemphigus vulgaris, pemphigus vegetans, pemphigus of the mucous membranes and familial benign pemphigus are extremely rare whereas pemphigus foliaceus and pemphigus erythematosus are very frequent. In the present study 213 sections were taken from 183 patients. The commonest feature found was acantholysis in the upper portion of the epidermis, leading to the formation of a cleft, which may be either subcorneal, just below the granular layer in the upper part, or, rarely, in the middle of the rete Malpighii. As the cleft increases it may cause detachment of the upper part of the epidermis, without bulla formation, or may develop into an intra-epidermal bulla, usually superficial. The roof of the bulla may consist of horny layer alone, horny and granular layers and also sometimes one or several rows of Malpighian cells. The floor is formed by the rest of the epidermis. The intact bulla may be tense or flaccid and within it are found a variable number of acantholytic cells, with some polymorphs and a few eosinophils.

In older bullae the changes of chronic inflammation are seen with acanthosis, papillomatosis, hyperkeratosis, and follicular plugging with or without parakeratosis. Occasionally the picture may resemble psoriasis or exfoliative dermatitis but is distinguishable by acantholysis at the top of the epidermis. In the Malpighian layers cells are separated individually or in groups and the granular cells may resemble the *corps ronds* or grains of Darier's disease. The dermis shows no significant changes. The most constant histological feature was acantholysis.

In any phase of the disease the epidermal changes found and their location made the diagnosis of pemphigus foliaceus possible in 91·8% of all cases.

The literature on histopathological differential diagnosis is summarized in 2 tables and there are 9 photomicrographs. *H. T. H. Wilson*

WEGMANN, T. & ZOLLINGER, H. U. Tuberkuloide Granulome in Mundschleimhaut und Halslymphknoten: Südamerikanische Blastomykose. **[Tuberculoid Granuloma in the Oral Mucous Membrane and Cervical Lymph Glands: South American Blastomycosis]** *Schweiz. med. Woch.* 1959, Oct. 31, v. 89, No. 44, 1151–3, 4 figs.

The English summary appended to the paper is as follows:—

"Presentation of a case of South American blastomycosis (Almeida's disease) with involvement of lungs and oral cavity (visceral type). As usual a clinical diagnosis based upon the pulmonary changes was not possible, diagnosis was verified by histologic examination of 3 biopsies from mouth and lymph nodes and by fungal cultures. There was rapid remission of the pulmonary changes under specific therapy, while in the mouth a new lesion appeared. Working as a cabinet maker, the patient had been exposed to dust from tropical woods for many years, first in Sao Paulo, Brazil, later in Switzerland. Since there was no traumatic lesion to be found in the mouth, the infection occurred probably by air."

VERONESI, R., ALBUQUERQUE, F. J. M. e, DEL NEGRO, G., SAMPAIO, S. A. P., FERREIRA, J. M. & MEIRA, D. A. Resultados terapêuticos obtidos com o emprêgo da anfotericina B em formas superficiais e profundas da blastomicose Sul-Americana. **[Therapeutic Results with the Use of Amphotericin B in Superficial and Deep Forms of South American Blastomycosis]** Reprinted from *Rev. Hosp. Clín.* 1959, v. 14, 231–48, 17 figs. [11 refs.]

The English summary appended to the paper is as follows:—

"The authors report their preliminary impressions on the usefulness of Amphotericin B in the treatment of different clinical forms of South American blastomycosis (*Paracoccidioides brasiliensis*).

"The drug is effective only when used by the intravenous route and shows the best results on the mucocutaneous forms of blastomycosis. The lymphatic forms show a reasonable response to the treatment. However the results obtained in these forms have not been evident like those observed in the mucocutaneous forms. Visceral forms of blastomycosis, mainly when started long ago, do not show any evidence of improvement, either clinically or by the laboratory tests.

"Toxicity was revealed by fever, chills, generalized pain, phlebitis, nausea and vomiting. No evident alterations were observed in the liver and kidney functions and in the blood picture. Blood urea increased in just one case but returned promptly to normal levels.

"Sulfonamides still have their place in the treatment of South American blastomycosis, since Amphotericin B cannot be administered to out-patients and the drug seems to have just a transitory fungistatic effect.

"Amphotericin B solved, partially, the problem of patients who developed resistance to sulfonamide drugs."

TROPICAL OPHTHALMOLOGY

POLEFF, L. Culture de l'agent étiologique et son importance dans la pathologie et la thérapeutique du trachome. **[Cultivation of the Aetiological Agent and its Importance in the Pathology and Treatment of Trachoma]** *Rev. Internat. du Trachome.* 1959, v. 36, No. 4, 454–68. [44 refs.]

A general review and discussion.

SANNA, A., ANGELILLO, B. & PISANO, E. Ulteriori ricerche sull'esistenza di relazioni antigeniche fra i virus del gruppo linfogranuloma-psittacosi e quello del tracoma. **[Further Researches on the Existence of Antigenic Relations between the Viruses of the Lymphogranuloma-Psittacosis Group and of Trachoma]** *Igiene Moderna.* 1959, May–June, v. 52, Nos. 5/6, 415–21. [11 refs.]

The English summary appended to the paper is as follows:—

"A further series of researches has been carried out on the existence of antigenic relations between the viruses of the lymphogranuloma-psittacosis group and of trachoma.

"93 samples of sera from trachomatous patients have been comparatively tested with ornithosis antigen by means of the complement fixation and the conglutinating complement absorption test.

"Positivity was frequently found with both methods: 58·8 per cent with conglutination and 54·3 per cent with complement fixation. In all cases, the titers were considerably low (1:4 - 1:16)."

HEAT STROKE AND ALLIED CONDITIONS

LEITHEAD, C. S., LEITHEAD, L. A. & LEE, F. D. **Salt-Deficiency Heat Exhaustion.** *Ann. Trop. Med. & Parasit.* 1958, Dec., v. 52, No. 4, 456–67, 2 figs. [Numerous refs.]

The authors describe 59 cases of salt-deficiency heat exhaustion which occurred in 1956–57 among oil tankers' crews in the Persian Gulf (46% of a total of 128 cases of heat collapse).

A level of urinary chloride less than 3 gm. per litre as NaCl (by Fantus test) in the presence of appropriate signs and symptoms, warranted a diagnosis of salt deficiency.

Clinical features did not differ much from those described by previous authors which are summarized in this paper as percentage incidence in a total of 532 cases. Body temperatures were lower than those described by LADELL *et al.* [this *Bulletin,* 1945, v. 42, 143].

It is recommended that intake of NaCl should be at least 20 gm. per day for upper deck crews and at least 30 gm. per day for engine room and galley personnel. *M. L. Thomson*

MISCELLANEOUS DISEASES

SHAPER, A. G. & WILLIAMS, A. W. **Peptic Ulcer in Africans.** [Correspondence.] *Brit. Med. J.* 1958, Oct. 17, 757–8.

The correspondents confirm the statement made by RAPER [this *Bulletin*, 1959, v. 56, 1062] that peptic ulcer is of much the same frequency among Uganda Africans as among people in England and add that this may well be true of the Belgian Congo and West Africa also. Raper's impression that the condition is relatively little recognized clinically is perhaps due largely to the fact that hospital statistics in tropical Africa cannot be directly compared with those in the United Kingdom. Where there are so few hospitals to deal with so many ill people, it is the more acute and obvious diseases that tend to be listed as diagnoses. Many patients with peptic ulcer come to hospital not for this condition but for more compelling reasons, and most of those who do complain of the symptoms of peptic ulcer have to be treated as out-patients. Similarly, the number of patients operated on appear at first sight to be very few compared with the total bulk of surgery performed in tropical hospitals in Africa. But when the types of operations are examined critically, it is seen that there is no equivalent in U.K. hospital surgery to the vast numbers of operations for hernia, urethral stricture, elephantiasis, tropical ulcers, trachoma, etc.

At the Mulago hospital (where Raper made his observations), there were in 1957 70 admissions for peptic ulcer on the medical side and 14 on the surgical, and these probably represent an incidence not very different from that in the U.K. The history is often as clear and typical as in the U.K. The sex incidence is similar, and the great proportion of patients examined radiologically or coming to operation prove to be duodenal cases. Among African students who are kept under regular medical observation, the condition is far from uncommon: for example, 7 admissions out of 30 in 1957 among the nurses (apart from malaria and upper respiratory infections) were thus diagnosed.

What is true for peptic ulcer is probably true also for other "non-tropical" medical diseases such as hypertension and diabetes.

Not until preventive and domiciliary medical practice become better established will the hospitals of tropical Africa be able to sort their patients sufficiently to deal with peptic ulcer and other medical problems with the care they deserve. *J. R. Rose*

JARA, A. B. Onyalai—Revisão crítica e subsídios para a investigação de sua etiologia. [**Onyalai and its Aetiology**] *Anais Inst. Med. Trop.* Lisbon. 1958, June, v. 15, No. 2, 401–43. English summary (7 lines).

Between October 1953 and January 1955 the author saw 18 cases of onyalai at Saurimo (Angola). He considers that it is an African disease affecting persons, predominantly Africans, living between the equator and 26°S. Both sexes and all ages are liable and there is no seasonal incidence. The clinical symptoms—haemorrhagic vesicles or bullae on the mucosae, especially of the buccal cavity—do not differ from those given in the usual textbooks, but a point to which the author draws attention is that while the edges of the gums may show haemorrhages or raw bleeding areas, the gums themselves look quite healthy.

In addition to the usual blood examinations, examination of the bone marrow was carried out. This showed that in the acute phase there were practically no megakaryocytes so the author considers that there is a defect in their maturation, and the thrombocytopenia, although present, is not the fundamental lesion. Delayed clot retraction was marked in 11 of the patients.

Since some consider the disease to be due to vitamin deficiency, extensive trial was made with almost the whole gamut of vitamins, but without effect. The author, on the hypothesis that it may be, partly at least, due to a bacterial toxin or to a virus, tried two antibiotics, Aureomycin and oxytetracycline. 8 of the patients were successfully treated with Aureomycin, 2 × 250 mgm. capsules every 6 hours for not less than 7–8 days, or oxytetracycline, 1 capsule every 6 hours. Improvement started in 48 hours but relapse may occur if the treatment is not continued for some days longer. Patients treated with antibiotics improved very much more rapidly than with blood transfusions etc. None of the patients had a diet deficient in vitamins.

The author considers that although the condition is an infection, additional factors cannot be excluded. Full case histories are given.

W. K. Dunscombe

McKenzie, R. **Tropical Eosinophilia in the Royal New Zealand Air Force.** *New Zealand Med. J.* 1959, Aug., v. 58, No. 326, 495–8, 2 graphs on pl.

"Two cases of tropical eosinophilia in R.N.Z.A.F. servicemen at Laucala Bay in Fiji have been described.

"Both cases presented unusually with abdominal signs and symptoms.

"Clinical improvement by intravenous arsenic is dramatic but rest during the course would seem highly desirable."

Higginson, J. **Pathogenesis of Liver Cancer in the Johannesburg Area. (S. Africa.) Part I.** Reprinted from *Acta Union Internat. Contre Cancer.* 1957, v. 13, Nos. 4/5, 590–98.

In Johannesburg, a high relative incidence of primary liver cancer has been observed [see this *Bulletin*, 1951, v. 48, 845]. Material for this paper was derived from large numbers of liver biopsies and post mortems. Diffuse portal fibrosis, increasing in frequency and severity with age but of earlier appearance in males, was the commonest liver lesion found. Severe cirrhosis with architectural distortion with or without necrosis and scarring, was relatively the same in incidence at all ages and in this group primary liver cancer most frequently developed, causing death in 54% of such cases in males. Fatty change occurred with any frequency only in infants and children suffering from kwashiorkor, or severe gastro-enteritis. Siderosis was observed in a high proportion of Bantu subjects. The author believes that diffuse portal fibrosis is not (in the majority of cases) the direct result of fatty change or nutritional deficiency, but most probably the effect of haemosiderin deposition potentiated by previous damage to the liver in infancy.

The general histopathological features of liver carcinoma in South Africa are described; the proportion of cholangiocellular tumours to hepatocellular tumours especially in males is lower than that observed in East Africa [*ibid.*, 1953, v. 50, 452], and the hepatocellular carcinoma is more frequently associated with cirrhosis. Cystological changes in his patients, and the general relation

of carcinoma to other changes in the liver, lead the author to suggest that regeneration of liver tissue is a more marked phenomenon in the Bantu as compared to the European and this regenerative capacity of the Bantu liver is responsible for the cancerous change which develops. If this is the case it is possible that elimination of dietary stress in early life or elimination of hepatotoxic agents in later life may be the best methods of prevention of this cancer.

C. S. Leithead

MOUSTARDIER, G., DULONG DE ROSNAY, C. & SALVAT, J. Étude de la sensibilité aux antibiotiques d'une souche de bacille de Whitmore. [**Study of Sensitivity to Antibiotics of a Strain of Whitmore's Bacillus**] *Ann. Inst. Pasteur.* 1959, June, v. 96, No. 6, 697–701.

The sensitivity to antibiotics of a strain of *Malleomyces pseudomallei* repeatedly isolated from a case of melioidosis was determined in the first place by a disk method, and further by a dilution method with subculture to determine the degree of bactericidal action. The most active, by the latter more precise method, were found to be the tetracyclines (chlortetracycline 2-fold better than the other 2), novobiocin and chloramphenicol. Somewhat higher tetracycline concentrations than the bacteriostatic were fully bactericidal. Penicillin and neomycin had a lesser activity, and streptomycin, bacitracin, polymyxin and the erythromycin group had none. Some tests of combined action favoured a mixture of tetracycline, oleandomycin and chloramphenicol [this seems unexpected, since oleandomycin was inactive alone]. Despite 3 courses of treatment with tetracyclines, the sensitivity of the re-isolated organism was unchanged.

[See also this *Bulletin*, 1955, v. 52, 692.] *L. P. Garrod*

PARASITOLOGY: GENERAL

ARADI, M. P. Budapesti lakosok bélprotozoon szürövizsgálatának értékelése. [**Analysis of the Results of a Survey of Intestinal Protozoa in Budapest**] *Egészségtudomány.* Budapest. 1959, v. 3, No. 3, 237–44, 1 chart. [16 refs.] German summary.

The author examined the faeces of 1,785 inhabitants of Budapest for intestinal protozoa and found an overall incidence of 20·6%—this was 27·1% in 569 adults and 21·6% in 1,216 children.

The results were analysed separately in children up to 14 and in older persons up to 50 years and over, as follows:

	Children %	Adults %
Entamoeba histolytica	0·3	0·7
Giardia intestinalis	11·4	4·4
Endolimax nana	3·5	9·3
Iodamoeba bütschlii	0·4	3·2
Entamoeba coli	5·1	9·1
Trichomonas hominis	0·1	0·2
Enteromonas hominis	—	0·2

Giardia predominated in the inner districts of Budapest and amoebae in the outer districts. Non-pathogenic amoebae were common in adults and *Giardia* in children, the latter being commonest in those aged 1 to 3 years and 6 to 8 years. It is suggested that soiled hands seemed to play a part in infection with *Giardia*. *H. J. O'D. Burke-Gaffney*

FRAGA DE AZEVEDO, J., FARO, M. M. da C., DE MORAIS, T. & DIAS, J. de A. As parasitoses intestinais em Manica e Sofala (Moçambique). [**Intestinal Parasites in Manica and Sofala, Mozambique**] *Anais Inst. Med. Trop.* Lisbon. 1958, Dec., v. 15, No. 4, 833–42, 1 fig. [10 refs.] English summary.

The senior author and his colleagues had previously studied the incidence of intestinal parasites in South Save, Mozambique [this *Bulletin*, 1955, v. 52, 836]. They now extend this study to a report on intestinal parasites in the province of Manica and Sofala, which is shown in a map with its districts and sub-districts.

Stools of 2,056 children (95% of them under 15 years of age) were examined by direct and concentration methods. The findings are discussed and set out in very great detail in 10 tables which show results for helminths, protozoa and both together in relation to age, sex, districts, sub-districts and the whole Province. Helminthic parasites were found in 31% and protozoa in 35%.

The incidences varied in different localities and were only high in some areas; thus hookworms amounted to 43·9% in Cheringoma (Beira District), *Ascaris* to 29·1% in Beira and *E. histolytica* to 14% in Sofala. Much lower rates were found in Tete District. Protozoa were distributed more evenly between the districts, but rates between 40% and 50% were encountered in a number of places in Beira District. Protozoa were found more commonly at lower levels, but altitude did not seem to be significant in the case of helminths. In the Province as a whole, *Ascaris* was found in 13·4% of cases and hookworms in 19·6%. The other pathogenic parasites did not exceed 7% and were usually less than 1%.

A table compares the findings with those of 9 other surveys made previously by different workers in various parts of Mozambique, but the conditions of study were not fully comparable in these cases. *H. J. O'D. Burke-Gaffney*

FERREIRA, A. P. & GÂNDARA, A. F. Sobre a incidência das parasitoses intestinais na população juvenil da cidade de Macau. [**Incidence of Intestinal Parasites in Children and Adolescents in Macao**] *Anais Inst. Med. Trop.* Lisbon. 1958, Dec., v. 15, No. 4, 909–16. English summary (3 lines).

This paper is one of a series in the same issue of these *Anais* dealing with a study of conditions in the Portuguese province of Macao (southern China) undertaken in 1956 by a Mission from the Institute of Tropical Medicine in Lisbon. The papers are abstracted separately in this *Bulletin* in appropriate sections.

Previous findings of intestinal parasites from hospital records between 1952 and 1955, are shown in a table.

This paper deals specifically with 327 young persons aged 3 to 20 years, two-thirds of whom were Chinese and the remainder of mixed origin.

Faeces were preserved in MIF and examined by a direct method in every case: in 95 cases concentration by centrifugation was done and in 210 a salt flotation technique. These methods were compared and their relative values for the identification of different parasites discussed. These results are shown in a table, and in general confirm usual experience.

The results of direct examination are shown by race, sex, age-group and type of parasite. The commonest findings were of *Ascaris*, *Trichuris* and *Enterobius* which amounted in the Chinese and "mixed" subjects respectively to 16·5%, 18·5% and 1·5% and 20·9%, 27·3% and 8·2%. *Clonorchis* and *Fasciola* were found 3 times and once respectively in the Chinese and 4 times each in the mixed group; among the "mixed" all 8 parasites were found in children aged 7 to 14 years. Intestinal protozoa were relatively few. *Giardia* was found in 3 of 110 "mixed" subjects, and *Entamoeba histolytica* in 1. The figures for Chinese were 2 and 7: in this group *Endolimax nana* was also found twice. *H. J. O'D. Burke-Gaffney*

MICHAJŁOW, W. **Resistance of Hosts and Endoparasites; Parasitological Groups of Hosts and Types of Systems "Host-Parasite".** *Acta Parasitologica Polonica.* Warsaw. 1959, Sept. 15, v. 7, 467–87. [31 refs.]

SEBASTIANI, A. & ILARDI, I. La prova della ritenzione della bromosulftaleina in alcune parassitosi intestinali. [**The Bromsulphthalein Test in Various Intestinal Parasitic Infections**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1959, Sept., v. 40, No. 9, 517–20, 1 fig. [16 refs.]

URSO, B. & MASTRANDREA, G. Osservazioni sul metodo Basnuevo-Figares per la conservazione e la ricerca con arricchimento di protozoi e di uova di elminti nelle feci. [**The Basnuevo-Figares Conservation and Enrichment Method for Protozoa and Ova in the Faeces**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1959, Aug., v. 40, No. 8, 437–44, 3 figs. English summary (7 lines).

According to one of its discoverers (Basnuevo) it is possible by this conservation and enrichment method to detect 90% of *Entamoeba histolytica* infections if 6 specimens of faeces (1 every 3 days) are examined. A stock solution is made up as follows: methylene blue, 3 gm.; 95% alcohol, 40 cc.; phenol, 8 cc.; aq. dest., 40 cc.; 40% formol, 10 cc. This can be kept in bottles for as long as 5 years without deterioration.

For use it is diluted as follows: stock, 1 cc.; phenol, 0·10 cc.; aq. dest., 89 cc.; 40% formol, 10 cc. About 1 gm. faeces is placed in a centrifuge tube with 10 cc. of the solution, the tube stoppered and well shaken; it is then centrifuged for 5 minutes at 400 g, and the sediment examined.

100 specimens of faeces were then tested by examination of the fresh specimen, by the Basnuevo-Figares method, and by this method combined with fractional centrifuging. The results are shown in a table. 1 case of *E. histolytica* was detected by each of the three methods, but the last gave better results than either of the other two for the remaining intestinal protozoa and for helminth ova. *E. histolytica* and *E. coli* could be recognized after 3 months in the Basnuevo-Figares solution, and *A. duodenale* ova after 5 months, while *Giardia* and ova of *Ascaris, Taenia*, and *Trichuris* could still be recognized

after 6 months. The authors feel that the best results will be obtained if fractional centrifugation is used with the Basnuevo-Figares solution on several samples of each specimen. *W. K. Dunscombe*

SWIERSTRA, D., JANSEN, J., Jr. & VAN DEN BROEK, E. **Parasites of Zoo-Animals in the Netherlands. Survey of Parasites of Zoo-Animals and Animals not Endemic in the Netherlands, identified from 1948 to 1958 inclusive.** *Tijdschr. v. Diergeneesk.* 1959, Nov. 15, v. 84, No. 22, 1301–5.

RUSSELL, J. G. B. *Pneumocystis* **Pneumonia associated with Agammaglobulinaemia.** *Arch. Dis. in Childhood.* 1959, Aug., v. 34, No. 176, 338–41, 1 fig. [15 refs.]

"A patient with *Pneumocystis carinii* pneumonia is described in whom there was associated agammaglobulinaemia. This latter seemed to be congenital in origin, and is unusual in that it occurred in a female infant."

MCKAY, E. & RICHARDSON, Janet. *Pneumocystis carinii* **Pneumonia associated with Hypogammaglobulinaemia.** *Lancet.* 1959, Oct. 31, 713–15, 4 figs. [10 refs.]

"The clinical picture of pneumocystis pneumonia is clearly defined, and this diagnosis should be considered in any infant with pneumonia showing the characteristic features of increasing oxygen starvation, failure to respond to antibiotics, and radiological changes out of proportion to the clinical signs. It is furthermore necessary to investigate the serum-protein pattern in these cases.

"The case here described throws no further light on the aetiological agent in pneumocystis pneumonia, but supports the association noted by Bird and Thomson [see this *Bulletin*, 1957, v. 54, 882] between this disease and hypogammaglobulinaemia. As in their cases, this patient also did not have the recurrent pyogenic infections usually seen in hypogammaglobulinaemia. The occurrence of diarrhoea in patients with congenital hypogammaglobulinaemia has recently been emphasised by Firkin and Blackburn (1958), and was a prominent feature in our case."

ENTOMOLOGY AND INSECTICIDES: GENERAL ZOOLOGY

[Papers on the toxic effects of insecticides in man are abstracted in the *Bulletin of Hygiene* under the general heading of Occupational Hygiene and Toxicology.]

BARTH, R. Metodos usados em microanatomia e histologia entomológica. [**Methods used in Microanatomy and Histology in Entomology**] *Mem. Inst. Oswaldo Cruz.* 1958, Dec., v. 56, No. 2, 453–71.

GRENIER, P. Remarques concernant le fonctionnement des mandibules chez les femelles de diptères hématophages nématocères et brachycères. [**Observations on the Function of the Mandibles in Female Nematocera and Brachycera**] *Ann. Parasit. Humaine et Comparée.* 1959, v. 34, No. 4, 365–85, 4 figs. [42 refs.]

FAY, R. W. & MORLAN, H. B. **A Mechanical Device for separating the Developmental Stages, Sexes and Species of Mosquitoes.** *Mosquito News.* 1959, Sept., v. 19, No. 3, 144–7, 1 fig.

The device is ingenious and not too elaborate. It is fully described and illustrated. It depends for its function as a separator on the relative sizes of the particular mosquito stages being separated. A given manipulation, say the collection of 1,000 pupae, takes a quarter of the time required by orthodox methods. Its uses with mosquitoes are for separating stages in laboratory cultures and mixed species in field collections where size permits, but it may have uses in other aspects of aquatic ecology. *D. S. Bertram*

SALITERNIK, Z. **The Problems of Mosquitoes in Israel and their Control.** *Proc. 45th Ann. Meeting New Jersey Mosquito Extermin. Ass.* 1958, Mar. 12, 13 & 14, 70–79. [12 refs.]

[See also this *Bulletin*, 1955, v. 52, 116 ; 1956, v. 53, 974 ; 1958, v. 55, 242.]

REES, D. M. **Mosquitoes and Mosquito-Borne Diseases in Indonesia and their Control.** *Mosquito News.* 1959, June, v. 19, No. 2, 48–51, 1 fig.

VAN DEN ASSEM, J. **Some Notes on Mosquitoes collected on Frederik Hendrik Island (Netherlands New Guinea).** *Trop. & Geograph. Med.* Amsterdam. 1959, June, v. 11, No. 2, 140–46, 4 figs.

Frederik Hendrik Island is one of the most notorious mosquito-ridden islands in New Guinea, yet there is a low incidence of malaria and filariasis in the human population. The main part of the island is a swamp, and small native villages are scattered in the swamp, built on artificial mounds. In some villages " anti-mosquito houses " still exist, dome-shaped dwellings about 10 feet high with only one small entrance hole, 50 × 50 cm., at ground level. A fire is kept burning just inside the entrance to these houses. Mosquito nets are now being used also.

The dominant man-biting species were *Aëdes wallacei*, *Anopheles bancrofti* and *Mansonia uniformis*. During the rainy season 22 other species of mosquito were recorded in addition. The author comments on the presence of possible vectors and the low incidence of human disease. *A. bancrofti* is a poor vector of malaria and *A. farauti*, an important vector on the mainland, is found only on higher ground on the island. However, *M. uniformis* and *Aëdes* are vectors of filariasis on the mainland [this *Bulletin*, 1957, v. 54, 1214 ; 1958, v. 55, 1260] and are also common on the island. One of the points the author makes to explain this anomaly is that the huge population of mosquitoes present on the island, where man is relatively rare, must feed on alternative hosts and that this may interrupt the transmission of *Wuchereria bancrofti* from man to man. Measurements of the ampullae of *A. bancrofti* indicated a daily mortality in this species of about 30%, but comparable figures of high mortality were not available for *Mansonia*. *B. R. Laurence*

BOHART, R. M. **A Survey of the Mosquitoes of the Southern Ryukyus.** *Mosquito News.* 1959, Sept., v. 19, No. 3, 194–7.

The Southern Ryukyus islands are near Okinawa, and of similar climate. What is considered a representative collection of mosquitoes includes *Anopheles ohamai*, *A. sinensis* and *A. minimus*, the last the main vector of some malaria. Numbers of culicine species are as follows: *Culex* (13), *Aëdes* (10), *Mansonia* (2), *Uranotaenia* (4), and single species of *Tripteroides*, *Toxorhynchites*, *Ficalbia*, *Harpagomyia*, *Armigeres* and *Orthopodomyia*. There are brief notes on distribution, adult and breeding habits. *C. quinquefasciatus* [*C. p. fatigans*], *C. bitaeniorhynchus*, *Aëdes aegypti*, *Aëdes albopictus* and *Mansonia uniformis* are among the culicine species. *D. S. Bertram*

HEDEEN, R. A. **A Review of the Mosquito Larvae of France. II. The Genus** *Aëdes*. *Mosquito News.* 1959, Sept., v. 19, No. 3, 179–83, 2 figs.

"This paper is the second in a series concerned with the identification of the larvae of the mosquitoes of France. The genus *Aëdes* is considered in this paper, and a key for the identification of the species is included. Several previously described species are grouped into the *pulchritarsis* complex, and consideration is given to species that are considered likely to occur in the country but which have not been reported at this writing."

[See this *Bulletin*, 1959, v. 56, 667.]

GALLIARD, H. Recherches sur la biologie des culicidés à Hanoï (Tonkin—Nord Vietnam). I. Développement larvaires comparatif de différentes souches d'*Aëdes albopictus, A. aegypti, Culex fatigans* et *Armigeres obturbans*. [**Studies in the Biology of Culicides at Hanoi. I. Comparative Larval Development of Different Strains of** *Aëdes albopictus, Aëdes aegypti, Culex fatigans* **and** *Armigeres obturbans*] *Ann. Parasit. Humaine et Comparée.* 1958, v. 33, Nos. 1/2, 131–44.

LOOMIS, E. C. & HANKS, S. G. **Light Trap Indices of Mosquito Abundance: a Comparison of Operation for Four and Seven Nights a Week.** *Mosquito News.* 1959, Sept., v. 19, No. 3, 168–71, 1 fig.

"Operation of light traps on either a four- or seven-trap night a week schedule was shown to give acceptable seasonal population trends of adult *Culex tarsalis* in the Central Valley of California. The two schedules of operation gave similar results under a variety of conditions and in different locations during a two-year period. Light traps used four consecutive nights, Monday through Thursday, rather than seven nights may insure a better schedule of operations within mosquito control agencies."

FAY, R. W., BAKER, J. T. & JENSEN, J. A. **Radioactive Tagging of** *Culex quinquefasciatus* **(Say) with P^{32}.** *Mosquito News.* 1959, Sept., v. 19, No. 3, 139–43.

RAGEAU, J. & VERBENT, G. Le genre *Taeniorhynchus* (Diptera, Culicidae) en Nouvelle-Calédonie et aux Nouvelles-Hébrides. [**The Genus** *Taeniorhynchus* **in New Caledonia and in the New Hebrides**] *Bull. Soc. Path. Exot.* 1959, May–June, v. 52, No. 3, 358–66, 5 figs. [26 refs.]

NAKAGAWA, P. Y. & HIRST, J. M. **Current Efforts in Mosquito Control in Hawaii.** *Mosquito News.* 1959, June, v. 19, No. 2, 64–7.

Before 1826 mosquitoes were unknown in Hawaii. *Culex fatigans* was introduced from Mexico in that year; *Aëdes aegypti* was found to be widespread in 1892; and *Aëdes albopictus* was not noticed until 1902. Dengue has occurred in epidemics in the islands, notably in 1903, 1912 and 1943–44.

Current control measures against *C. fatigans* involve chemical control of adults and larvae with malathion, which is now used instead of DDT. Larvae from different areas have shown resistance to DDT at levels ranging from 0·0438 p.p.m. to 0·25 p.p.m. Larvicide is applied by hydraulic power sprayers and also from aeroplanes. Misting is also used during the day in areas of high adult density. Light traps are widely used to estimate adult density.

Larval control in one volcanic pool was hindered by algal growth at the surface. The introduction of about 1,500 fish, *Tilapia mossambica,* known to feed on algae, from Malaya resulted in the clearing of the algal growth after about 3 months. *Gambusia* were introduced with the *Tilapia* and no further control measures were considered necessary.

Species of *Toxorhynchites* (= *Megarhinus*) have also been introduced in attempts to control *Aëdes albopictus* but, although successfully established, there has been no corresponding reduction in the numbers of *Aëdes albopictus.*

The possibility of reducing the number of artificial breeding places by the introduction of abrasives to replace water in the washing of sugar cane is also being investigated. *B. R. Laurence*

ZIVKOVITCH, Vera. Description d'une nouvelle espèce de simulie: *S. simici* n. sp. (Diptera, Simuliidae) trouvée en Yougoslavie. [**A New Species of** *Simulium, S. simici,* **found in Yugoslavia**] *Bull. Soc. Path. Exot.* 1959, May–June, v. 52, No. 3, 287–95, 4 figs.

PORTER, J. E. **Some Effects of Screens in retarding Entry of the Common Salt-Marsh Sand Fly,** *Culicoides furens* **(Poey) (Diptera: Heleidae).** *Mosquito News.* 1959, Sept., v. 19, No. 3, 159–63, 3 figs.

" Seven different meshes of insect screens namely, 14 × 14 galvanized, 18 × 14 bronze, 18 × 14 aluminum, 18 × 14 plastic, 18 × 18 bronze, 20 × 20 plastic and 20 × 20 aluminum were evaluated as barriers to the entrance of the common salt-marsh sand fly, *Culicoides furens* (Poey). Four screens were found to exclude 90 per cent. or better of the sand flies, 20 × 20 aluminum, 20 × 20 plastic, 18 × 18 bronze and 18 × 14 plastic, but two of these, 20 × 20 aluminum and 20 × 20 plastic, excluded so much light and airflow that they are not ordinarily satisfactory for use in the tropics or semi-tropics.

"The rate of airflow and light passage was determined for the seven screen materials tested. Its relationship is proportionate to the numbers of sand flies excluded."

STEYN, J. J. **Use of Social Spiders against Gastro-Intestinal Infections spread by House Flies.** *South African Med. J.* 1959, Aug. 29, v. 33, No. 35, 730–31.

The suggestion that in the Transvaal and other parts of South Africa the social spider, *Stegodyphus mimosarum* of African origin, be used for destroying house-flies no longer controllable by contact insecticides is supported by numerous instances of the success of the method. These vary from legendary records to favourable reports in recent years from farms, a research laboratory, a hospital and domiciles. The spiders make a composite nest in which they live together in harmony. The nest varies in size according to the number of occupants but may be as big as a football. One or more nests may be sited outside premises, or, indoors, hung by a window or ceiling light. The spiders do not roam about. The nest and web remain localized. In experimental work four bites were received in "many thousands" of handlings over 2 years. These did not even become septic. Suggestions are made of fly-infested public places (markets, abattoirs, etc.) suitable for this method of biological control.

[These spiders and their nests sound an interesting domestic alternative to a caged budgerigar or a potted geranium.] *D. S. Bertram*

BERNI, A., CAPIRCHIO, F. & JERACE, E. Ricerche sperimentali con un nuovo larvicida nella lotta contro le mosche. **[Experimental Studies with a New Larvicide in the Control of Flies]** *Nuovi Ann. d'Igiene e Microbiol.* 1959, Jan.–Feb., v. 10, No. 1, 62–7, 1 fig.

Laboratory and field experiments confirm that "Fly flakes" (active ingredients: o,o dimethyl-dithiophosphate of diethyl-mercaptosuccinate) are a practical, economic and effective method of controlling larval and adult house-flies. No special apparatus is required: "Fly flakes," which are water-soluble and non-toxic to animals and man in the concentrations used, may be sprinkled by hand on to breeding sites.

Treatment at about 100 gm./square metre caused effective reductions in larvae for 7–9 weeks. *R. J. Wood*

ROSEN, P. & GRATZ, N. G. **Tests with Organo-Phosphorus Dry Sugar Baits against Houseflies in Israel.** *Bull. World Health Organization.* Geneva. 1959, v. 20, No. 5, 841–7.

"Tests were carried out in rural areas in Israel with various organo-phosphorus dry sugar baits. Malathion 2·5%, diazinon 1% and Dipterex 1% gave equally effective results. Chlorthion 1% and malathion 1% and 2% were used in smaller quantities and were less effective.

"Dry poisoned baits are considered an important supplementary measure to a rural fly control programme, especially when used as an adjunct to basic sanitation."

HARRIS, W. G. & BURNS, E. C. **Phosphate Resistance in a Field Strain of House Flies.** *Amer. J. Trop. Med. & Hyg.* 1959, Sept., v. 8, No. 5, 580–82, 1 fig.

"Offspring from a field strain of house flies taken from the L.S.U. poultry farm in the Baton Rouge, Louisiana area in October 1957 were found by topical application to be highly resistant to malathion and DDT with varying degrees of resistance to the other insecticides tested. Malathion had been used exclusively for 3 years. Progeny from field strains taken from the same area in October and December 1958 were more resistant to malathion, perhaps due to continued use of the organic phosphates. In the resistant group the larval period was longer and pupation and emergence extended over a longer time interval than the Orlando, Florida susceptible strain."

[See this *Bulletin*, 1959, v. 56, 109.]

PARR, H. C. M. *Stomoxys* **Control in Uganda, East Africa.** [Correspondence.] *Nature.* 1959, Sept. 12, v. 184, Suppl. No. 11, 829–30.

Stomoxys calcitrans, *S. nigra* and *S. omega* occur in that order of abundance in certain sparsely populated territory used by cattle tribes in Mengo District, Uganda. It is not yet clear how these flies come to be so abundant in the dry season in certain areas lacking, so far as discovered, suitable breeding places. But, in one area of about 50 square miles, a poorly kept boma [cattle camp] was rich in vegetable matter decaying in cattle urine. *Stomoxys* bred prolifically in this boma. 4% chlordane was sprayed on foliage around the boma, where the flies rested. A second application was made 6 weeks later to compensate for wash-off by a freak storm. Within a month of the first spray, breeding had ceased in the boma, and no adults were found. Within 3 months the *Stomoxys* population over the 50 square miles in which these cattle were grazed had fallen by 99%. *D. S. Bertram*

LECLERCQ, M. Tabanidae (Dipt.) de France. VI. **[Tabanids of France. VI]** *Ann. Parasit. Humaine et Comparée.* 1959, v. 34, No. 4, 556–64, 1 pl. [11 refs.]

DOUCET, J., OVAZZA, M. & ADAM, J. P. Tabanides de Côte d'Ivoire. **[Tabanids of the Ivory Coast]** *Ann. Parasit. Humaine et Comparée.* 1958, v. 33, No. 3, 285–94, 1 fig. & 1 map. [11 refs.]

OVAZZA, M. & TAUFFLIEB, R. Une nouvelle espèce de taon de la région de Brazzaville: *Tabanus* (*Hybomitra*) *mailloti* n. sp. (Diptera, Tabanidae). **[A New Species of *Tabanus* in the Brazzaville Region:** *T.* (*Hybomitra*) *mailloti*] *Bull. Soc. Path. Exot.* 1959, May–June, v. 52, No. 3, 299–304, 3 figs.

MACKERRAS, I. M. & RAGEAU, J. Tabanidae (Diptera) du Pacifique Sud. [**Tabanids of the South Pacific**] *Ann. Parasit. Humaine et Comparée.* 1958, v. 33, Nos. 5/6, 671–742, 15 figs. [21 refs.]

ZUMPT, F. **The Tumbu Fly,** *Cordylobia anthropophaga* **(Blanchard), in Southern Africa.** *South African Med. J.* 1959, Oct. 10, v. 33, No. 41, 862–5, 2 figs.

This paper consists largely of an account of the life-history of *Cordylobia anthropophaga*, its behaviour in man and the question of acquired immunity. Much of this is based on the classical paper of BLACKLOCK and THOMPSON [this *Bulletin*, 1924, v. 21, 150] and the chief new interest lies in the evidence that the "Tumbu fly has continuously enlarged its territory" in southern Africa of recent years; this was first pointed out by DE MEILLON and GEAR who in 1947 recorded specimens from patients in the Transvaal Highveld [*ibid.*, 1948, v. 45, 119]. Hitherto the fly had been known in southern Africa only in the subtropical regions.

The author shows in a table and on a map that human infection with *C. anthropophaga* has occurred widely in the Transvaal and the neighbouring part of the Orange Free State. The list contains more than 30 records from southern Africa up to 1959 and most of them have been from these two regions: but the author notes that it is not always certain that the infection has been contracted in the district where the patient lived, as the larvae may remain in the human host for a considerable time.

There is a brief note on treatment. *H. J. O'D. Burke-Gaffney*

MCLEAN, E. M. **Intra-Abdominal Cystic Calcification of Unusual Aetiology and Presentation.** *Proc. Mine Med. Officers' Ass.* Johannesburg. 1959, May–June, v. 39, No. 369, 33–5, 1 fig.

"A case of calcification of the nymphs of the *Armillifer armillatus* has been described in a tropical native mine labourer, which presented as an acute abdomen. A differential diagnosis is discussed."

SAUTET, J. & ALDIGHIERI, R. Nouvelles études sur la sensibilité aux insecticides de *Pediculus humanus humanus* K. Linnaeus, 1758 en France métropolitaine. (Sud-Est, Paris, Nord). [**New Studies on the Susceptibility of** *Pediculus humanus humanus* **to Insecticides in Metropolitan France**] *Bull. Soc. Path. Exot.* 1959, Jan.–Feb., v. 52, No. 1, 87–97, 1 fig.

The occurrence of lice among men of no fixed abode (mostly tramps but including such diverse types as painters, electricians and teachers—full details are given of race, nationality, profession and age) has been investigated in 3 regions of France.

The degree of infestation tended to be low (18–78 lice per person) although one person was found with 236 lice.

Results indicate that cases of lice resistant to DDT are more common in the area round about Marseille (Provence) and Paris (Bassin Parisien) than in

northern France round about Lille (Nord). This is probably due to the less frequent use of DDT in the last-named region.

DDT-resistant strains included one with a low resistance to BHC and others with a low resistance to pyrethrins. Further tests revealed 2 cases of low resistance to BHC and one to pyrethrins, in the absence of DDT resistance.

The number of cases of resistance has risen considerably since the last survey was made in 1954 [this *Bulletin*, 1956, v. 53, 819] and it is concluded that there is reason for serious concern. *R. J. Wood*

GRATZ, N. G. **A Survey of Bed-Bug Resistance to Insecticides in Israel.** *Bull. World Health Organization.* Geneva. 1959, v. 20, No. 5, 835–40.

"Fourteen strains of bed-bugs collected from various places in Israel and one normally susceptible strain from the laboratories of J. R. Geigy S.A., Basle, Switzerland, were tested for their resistance to DDT and gamma-BHC. A very high degree of resistance to DDT was found in most of the strains, indicating that DDT-resistance is very widespread in Israel. A moderate to low resistance to gamma-BHC was observed in several strains."

See also p. 179, SCHENONE, Dermatitis pruriginosa producida por el ácaro *Dermanyssus gallinae* (De Geer, 1778). [**Pruriginous Dermatitis caused by the Mite *Dermanyssus gallinae* (De Geer, 1778)**]

MOREL, P. C. Les *Hyalomma* (Acariens, Ixodidae) de France. [*Hyalomma* **Species of France**] *Ann. Parasit. Humaine et Comparée.* 1959, v. 34, No. 4, 552–5. [13 refs.]

MOREL, P. C. & MOUCHET, J. Les tiques du Cameroun (Ixodidae et Argasidae). [**Ticks of the Cameroons**] *Ann. Parasit. Humaine et Comparée.* 1958, v. 33, Nos. 1/2, 69–111, 3 maps & 2 figs. [40 refs.]

PEARCE, G. W.; GOODEN, E. L.; JOHNSON, D. R.; GOETTE, Mary B.; SEDLAK, V. A.; MILES, J. W.; GRIMM, L. [i] **Specifications of the International Cooperation Administration for DDT Water-Dispersible Powder for Use in Malaria Control Programmes** [PEARCE, GOODEN & JOHNSON]. *Bull. World Health Organization.* Geneva. 1959, v. 20, No. 5, 913–20. [ii] **Storage Stability of DDT Water-Dispersible Powders** [PEARCE, GOETTE & SEDLAK]. *Ibid.*, 921–36, 4 figs. [iii] **Factors affecting the Suspensibility of DDT Water-Dispersible Powders** [MILES, GOETTE, GRIMM & PEARCE]. *Ibid.*, 937–45, 2 figs. [iv] **Factors affecting the Suspensibility of Dieldrin Water-Dispersible Powders** [PEARCE, MILES & GOETTE]. *Ibid.*, 947–53, 2 figs.

i. "Background information is presented on the development of specifications for 75% DDT water-dispersible powder for use in malaria control programmes supported by the International Cooperation Administration (ICA) of

the United States Government. Early difficulties with DDT powders used in these programmes were investigated and it was found that the most critical requirements involved packaging, suspensibility and storage stability. ICA specifications were evolved to meet these requirements. The suspensibility test developed is described, and the importance of inspection of the material procured is discussed."

ii. "The authors describe a study of the change in suspensibility of two series of 75% DDT water-dispersible powders during storage in simulated commercial packages at 27°C, 50°C and 65°C and as 'shelf' samples at ambient temperatures. All the products tested in both series were made under the conditions of regular commercial production, and all those in the second series were prepared in 1954 under contract to the International Cooperation Administration (ICA) and according to ICA specifications.

"The results showed that: (*a*) a high initial suspensibility is no criterion of 'shelf' life; (*b*) the suspensibility after the so-called 'tropical storage pretreatment' is no criterion of stability, except perhaps in the case of very poorly formulated products; (*c*) periodic observations, made over a period of a month or more, of the suspensibility of powders stored in commercial or simulated commercial packages at 50°C and 65°C will provide an indication as to the probable long-term stability of the products in question; and (*d*) it seems likely that a reasonable estimate of long-term storage stability at ambient temperatures could be obtained by subjecting the samples to high temperatures for a very short period."

iii. "The authors describe some experiments carried out to determine the effect of moisture, temperature, and pressure on the suspensibility of DDT water-dispersible powders.

"It was found that the removal of moisture brought about a slight increase in suspensibility; that heating for one hour at temperatures below 70°C resulted in an increase in suspensibility, due probably to the drying effect of the heat, whereas heating for the same period at temperatures above 70°C resulted in a decrease; that on prolonged heating at 70°C and 75°C the suspensibility decreased sharply in the first four hours but thereafter showed little change up to 20 hours; and, finally, that low pressures—for example, 25 g per cm^2—had little effect on the suspensibility, but that at pressures of 100 pounds per square inch (7 atm.) and over, it varied in inverse proportion to the logarithm of the pressure."

iv. "Various dieldrin water-dispersible powder formulations have been subjected to elevated temperature storage and the effect on their suspensibilities compared. The Shell Chemical Company's 50% dieldrin formulation AC 1630 was recommended for use in the malaria control programmes of the International Cooperation Administration rather than its 50% formulation AC 1631, on the basis of superior performance after storage at 50°C and 65°C. In a similar series of tests on 75% dieldrin water-dispersible powders, Shell formulation AC 1621, which contains Hi-Sil as diluent, was judged better than AC 6621, which contains Micro-Cel as diluent. A series of samples of AC 1621 was subjected to temperatures of 90–120°C for periods of 1–20 hours and the effect on suspensibility determined. Most samples withstood the treatment reasonably well at temperatures up to 110°C for 20 hours."

BERTAGNA, P. **Residual Insecticides and the Problem of Sorption.** *Bull. World Health Organization.* Geneva. 1959, v. 20, No. 5, 861–89. [28 refs.]

In this paper factors controlling the loss of insecticides from treated surfaces are reviewed. Particular reference is made to the use of BHC, dieldrin and DDT.

The author defines *persistency* as the "amount of an insecticide which is present at any given time, either on or below the treated surface, whether in an active or in a potentially active form". *Effectiveness* is defined as "the biological effect resulting from the application of insecticide deposits, from the amount of insecticide present".

Persistency is related to the volatility and vapour pressure of the insecticide in that high values for these constants are correlated with low orders of persistence. Laboratory tests and field trials with insecticides applied to impervious surfaces confirm this fact. On impervious surfaces, DDT and dieldrin are many times more persistant than BHC. Persistency is also affected by the formulation of the insecticide: wettable powders allow for greater persistency on sorptive surfaces than other kinds of formulations. The size of the particles of the insecticide is significant: larger particles persist longer but are less effective than small ones.

Persistency is greatly influenced by the type of surface on which the insecticide is deposited. Under field conditions, both impervious material (thatched roofs, wood, bamboo, etc.) and pervious or sorptive surfaces (mainly mud walls) are encountered. The loss of insecticides from pervious surfaces is complicated by the process of sorption. This process is mainly one of diffusion. On sorptive surfaces insecticides are lost in the order BHC, dieldrin, DDT. The rates of diffusion of insecticides are related to their volatilities and vary with changes in temperature and relative humidity. High humidity allows for a slower rate of sorption from the surface but once the insecticide has passed below the superficial layer of the mud, high levels of humidity tend to accelerate sorption. In the laboratory increased humidity gives greater effectiveness and this probably holds true for conditions in the field.

Sorption is controlled, to some extent, by the nature of the mud itself. Experimental studies show that both the chemistry of the mud and the insecticide influence sorption. Available evidence indicates that no significant chemical detoxification of insecticides takes place on mud surfaces. Sorption is related to size of the mud particles: the greater the proportion of small particles (less than 60 millimicrons in diameter) the more efficient is the mechanism of sorption.

Various methods for determining the sorptive capacity of muds have been devised but none of them are completely reliable. The most encouraging method employs ^{14}C-labelled DDT [MILES and PEARCE, this *Bulletin*, 1958, v. 55, 115] but further results from the use of this technique are awaited.

Existing techniques aimed at measuring persistency are not adequate because they do not account for the amount of the insecticide within the mud. This knowledge is important since some insecticides, such as BHC, are toxic in the vapour phase and the amount of insecticide being slowly released from within the mud will affect measures of persistency and effectiveness. Indeed, in the field, BHC has been found to remain effective for longer periods on sorptive than on impervious surfaces. In the case of insecticides like DDT only the

surface deposits are effective but the rate of penetration also depends on the amount of the insecticide already below the surface. An increase in persistency might, therefore, be accomplished through partial saturation of the upper layers of the mud by continual reapplication of the insecticides.

There are economic and practical reasons for not making use of techniques which might prevent sorption through modifications of the mud surface. Attempts to prevent sorption or extend persistency by changing the formulation of the insecticide show some promise. Resins mixed with dieldrin delay sorption, at least under laboratory conditions. Various polyphenyls added to BHC enhanced the persistency of this insecticide.

In the laboratory sorption has been shown to take place rapidly. The time may vary from a few hours to a few weeks. However, the effect of sorption on malaria control programmes is not known. It may be safely assumed that the phenomenon does take place in the field and the problem warrants attention. Results from bioassay tests—designed to give information on the practical repercussions of sorption—have been disappointing. It is suggested "that mortality from bio-assay be assessed against the actual amount of insecticide present and chemically determined". Curves representing the inactivation of insecticides could be plotted and "only then can a reasonable attempt be made to interpret the results or use them as an index within the general epidemiological picture". [See also BARLOW and HADAWAY, *ibid.*, 1959, v. 56, 674; PRESS, *ibid.*, 898.] *B. C. Fine*

HERNÁNDEZ-CORZO, J., BARRERA, A. & HECHT, O. **A Method for Bioassay of the Effectiveness of Residual Spraying.** *Mosquito News.* 1959, June, v. 19, No. 2, 91–4, 1 fig.

The activity of residual deposits of insecticides against *Anopheles albimanus*, *A. aztecus* and *A. quadrimaculatus* was studied by confining 10 female mosquitoes in shallow Petri-dish type chambers, moulded in the laboratory from a transparent plastic (cristal acetate, No. 1500) disc 105 mm. in diameter. The moulded chamber is 13 mm. deep, 70 mm. diameter across its closed base and 80 mm. across the open face which has a flat flange of about 3 mm. This chamber is pinned or taped by the flange with the open end against the vertical surface under test. An eccentric hole, which can be closed by a taped circle of plastic, in the base allows for introducing the mosquitoes; ventilation is provided by numerous holes pierced in the plastic base by a hot pin.

The procedure of a test embodies, ideally, fixing 4 such chambers on the treated vertical surface under study (commonly, for example, a residual deposit of known age in a house). This is the *test*. But a similar number of chambers are affixed to a surface (paper, for example) treated at the time, at a deposit something less than that of the natural *test* surface (commonly, at 50%). This is called the *experimental control*. Finally, *net controls* are desirable, these consisting of the application of chambers to various surfaces representing "all conditions of the test except the action of the insecticide". [These are not specified; it is possible to conceive what they should be, but it could be difficult to find or arrange for, in a programme of complete insecticide coverage, natural, domestic surfaces not treated in the scheduled sprayings. Carried

to perfection, a substantial number of mosquitoes would be required to meet these exposures to insecticide together with all of the net controls. It is thought that " test " here means perhaps the *test* as defined, and not the overall experimental procedure including *experimental controls*.]

Mosquitoes should not be caught indoors in sprayed premises, but by outdoor baiting, for example, or bred from immature stages. Females blood-fed some hours before the tests are preferred. If the mosquitoes are from localities other than that being examined, this should be noted: it should be avoided if possible.

There is no fixed period for observing knock-down; much depends on whether the mosquitoes of the *test* are knocked down before or after those in the *experimental control*. Knock-down is, in fact, tallied at 20-minute intervals. At the end of the exposure period (usually when knock-down in *tests* is 100%), mosquitoes are set aside in fresh containers (wax cups, etc.) and mortalities recorded at 24 hours.

The method is advocated as a method for bioassay of the persistence of insecticidal activity of treated surfaces. Should results suggest physiological resistance in the mosquitoes (*e.g.* slow knock-down in *experimental controls*) a suitable test such as the WHO standard method must be made.

The apparatus is figured and technique and interpretations discussed in general terms. No numerical data are given to illustrate the nature of the results, or the manner of their analyses. *D. S. Bertram*

HOSKINS, W. M. **Factors involved in the Development of Resistance to Insecticides and some Measures to reduce its Effect.** *Mosquito News.* 1959, June, v. 19, No. 2, 52–62, 3 figs. [19 refs]

The effects of selection are discussed with reference to log dosage-probit lines and it is concluded that specific resistance is essentially a preadaptive phenomenon. The potential of a natural population to develop resistance can, to some extent, be adjudged from the nature of its log dosage-probit line. For example, the flattening of the line is regarded as sound evidence that resistance is developing.

The author gives reasons for proposing certain measures which could delay the onset of resistance. The most important of these measures are: the initial correct setting of the level of control; cessation of the use of insecticides while a low level of resistance is still prevalent; spot treatment, *i.e.* leaving some areas untreated rather than universal application of insecticides; the use of chemical control only when natural control is inadequate.

The genetical basis for the reappearance of resistance after reversion to susceptibility has taken place is briefly discussed and the effects of adult and larval selection are considered.

Means of reversing the process under which resistance develops are discussed and, in this connexion, the author does not consider synergists or the simultaneous application of two insecticides (having different modes of action) to be of any great value. For two insecticides used together to have any useful effect, one of them should be more toxic to the resistant than the susceptible insects. Laboratory findings with compounds having this property are reviewed. Chemicals which reduce the reproductive output are known but

they do not discriminate between susceptible and resistant individuals. However, attention is drawn to a study which indicated that sub-lethal doses of diazinon lowered the reproductive potential of DDT-resistant but not DDT-susceptible female flies.

Since none of these approaches towards reversing selection have been tested in the field, their practical value cannot at present be estimated.

The author concludes by suggesting that man's interference with the dynamic balance between living organisms should be executed with caution.

B. C. Fine

MARIANI, M. Dieci anni di richerche sulla resistenza degli insetti agli insetticidi di sintesi. Rivista critica e repertorio bibliografico. [**Ten Years' Research on Insect Resistance to Synthetic Insecticides. Critical Review and Survey of the Literature**] Reprinted from *Atti Acad. Sci. Lettere e Arti di Palermo.* Ser. 4. 1957/58, v. 18, Pt. 1, 129–211, 2 figs. on pl. [590 refs.]

In a review occupying 38 pages of text, physiological aspects of insecticide resistance receive especial attention. Useful information is also given on cross resistance and the inheritance of resistance. In the section headed Test Methods an interesting comparison is made between the test methods of FAY *et al.* [this *Bulletin*, 1952, v. 49, 1083], BUSVINE and NASH [*ibid.*, 1953, v. 50, 1176] and MARIANI [*Boll. Soc. Entom. Ital.*, 1954, v. 84, 67].

Of particular value to the English reader will be the excellent bibliography of 590 references and the detailed analytical bibliographical index in which references are arranged according to subject.

R. J. Wood

REPORTS AND SURVEYS

PINTO, A. R. da C. Relatório anual da Missão Permanente de estudo e combate da doença do sono e outras endemias na Guiné Portuguesa (1956). [**Annual Report of the Permanent Sleeping Sickness Study Mission in Portuguese Guinea (1956)**] *Anais Inst. Med. Trop.* Lisbon. 1958, Dec., v. 15, No. 4, 1023–60, 3 maps and 3 graphs.

The Mission is charged with the duty of combating trypanosomiasis and other endemic diseases in an area of 38,000 sq. km., with a population of 510,000, and the extent of their work during the year can be judged by the fact that they saw over 350,000 persons, treated nearly 38,000 of them, and travelled over 100,000 km. throughout the province.

The principal diseases are: trypanosomiasis, malaria, yaws, ankylostomiasis, taeniasis, and leprosy. Treatment was as far as possible ambulatory (although over 8,000 patients were admitted to hospital) as this afforded a better opportunity of seeing the inhabitants actually in their villages and so getting a better idea of their hygiene conditions and the diseases to which they are liable.

The incidence of trypanosomiasis is slowly decreasing and *T. gambiense* is becoming rarer, though *Glossina palpalis* are still numerous. 880 new cases

were diagnosed during the year, the lowest number for 8 years; in 445 patients the disease had already affected the central nervous system. The anti-tsetse section found 102 villages with infected persons out of 160 villages visited. Yaws is treated by penicillin and aluminium monostearate; ankylostomiasis by tetrachlorethylene 0·12 cc./kgm. (with a maximum of 4 cc.) followed by iron sulphate to raise the haemoglobin. Malaria is mostly due to *P. falciparum*, though *P. malariae* occurs; the houses in *Anopheles* areas are dusted with DDT twice a year. Taeniasis (*T. saginata*) is especially prevalent in one area where there is a large cattle population. Leprosy has recently been found to be widespread and is mostly of the tuberculoid or intermediate type. A full-scale anti-leprosy campaign was to be started early in 1957 though some treatment had begun by December 1956. Among other diseases present are urinary schistosomiasis, and filariasis due to *Wuchereria bancrofti* and *Dipetalonema perstans* (according to the schedule of laboratory diagnoses).

Lack of sufficient qualified staff is impeding progress but the report gives a pleasant impression of important work well done in an area which is not so well known perhaps as it should be. *W. K. Dunscombe*

POLUNIN, I. **The Muruts of North Borneo and their Declining Population.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1959, July, v. 53, No. 4, 312–21. [21 refs.] Discussion 321–6 [HARE, R.; WADDY, B. B.; MCARTHUR, J.; SHORTT, H. E.; KOBLENZER, P. J.; POLUNIN, I. (in reply)].

The declining Murut population of North Borneo has long been a subject of discussion. A previous article [Polunin, this *Bulletin*, 1959, v. 56, 377] described the social and physical environment of the Muruts and considered various possible causes of their low fertility. It was concluded that pelvic infection was the cause of sterility.

The present paper recapitulates the author's previous work and reports the results of further investigations. A search was made for anaerobic streptococci which had been shown in other countries to be a cause of puerperal infection [*Bull. Hyg.*, 1955, v. 30, 365]. Cervical swabs were taken from 60 women from "infertile populations", were cultured immediately and the cultures then freeze-dried and transported to London for classification. A control group of 37 women from "fertile populations" were similarly examined. Of the former 38·3% harboured anaerobic streptococci, many belonging to a strain commonly associated with puerperal fever, compared with only 10·8% of the control group. Gonococci were absent but *Trichomonas vaginalis*, though absent from the fertile group, was present in 22·4% of the infertile. These findings do not prove but are consistent with the theory that a high carrier rate for anaerobic cocci leads to a high incidence of post-pregnancy infection. A satisfactory explanation for Murut depopulation would have to show that the factors incriminated had not always been operating in the past.

Professor Hare who had classified the cocci in London took part in the discussion. He stated that these anaerobic organisms were confined to the birth canal and when they caused infection they tended so to damage the pelvic organs that subsequent conception or pregnancy was unlikely. If they were the cause of Murut infertility it should respond to penicillin treatment.

T. H. Davey

BRICEÑO MAAZ, T. Geografia medica del Estado Anzoategui, Venezuela. [**Medical Geography of Anzoategui State, Venezuela**] *Archivos Venezolanos de Patol. Trop. y Parasit. Méd.* 1959, July, v. 3, No. 1, 50–120, 6 figs. & 2 maps. [15 refs.] English summary.

BOOK REVIEWS

RODGER, F. C. [M.D., Ch.M., D.O.M.S.] **Blindness in West Africa.** With a foreword by Stewart DUKE-ELDER, G.C.V.O., D.Sc., LL.D., M.D., F.R.C.S. pp. xiv + 262, 1 coloured pl., 6 maps & 96 figs. 1959. London: (For Royal Commonwealth Society for the Blind, 121, Victoria Street, S.W.1.) H. K. Lewis & Co. Ltd., P.O. Box 66, 136 Gower Street, W.C.1. [70s.]

This monograph is the report of the ophthalmological team sent out to West Africa by the Royal Commonwealth Society for the Blind in 1952.

Dr. Rodger's terms of reference were to assess the nature and incidence of the common eye diseases encountered in this region, and in particular to study the clinical aspects of onchocerciasis. This survey took 4 years and the production of this report has been eagerly awaited.

"The first part lists the results. It starts with a description of the survey area and its people, which is included as it is of importance to those workers studying epidemiological or socio-economic factors in eye disease. In addition, by sketching the background, it is a good way of putting the problems inherent in any control project into correct perspective. Next follows a brief discussion on the work of previous surveys in these same territories, or parts of them. The incidence and causes of blindness and ocular disease follow, the detailed break-down of the figures covering a great variety of factors. Nutritional disease of the eye and nutriture of the people are examined separately for in the case of the former no information was available in any of the three territories."

This part of the book is a little difficult to follow but, in general, is excellent. As will be expected, on general grounds the actual causation of blindness in any given area depends greatly on the amount of trachoma, the state of nutrition, previous epidemics of smallpox and measles and so forth.

It would be a mistake for the reviewer to attempt to pick out isolated statistics as given in this report; they can be made to prove any thesis which the reader wishes to establish. The accounts given of the physical difficulties encountered by the team and how these were overcome in carrying out their surveys, are of great interest to any person familiar with these territories, and the author deserves nothing but praise for the determined way in which these difficulties were tackled.

One figure is worth giving; the percentage of all blindness directly or indirectly due to malnutrition is given at 5%.

The second part of the book concerns onchocerciasis and other filarial diseases. After a brief introduction to the subject the clinical description of

ocular onchocerciasis is presented in the light of observations made by the author with a view not only to reporting the results, but also to help medical officers working in endemic areas. The incidence not only of onchocerciasis but also of the other filarial diseases from which men suffer in this part of the world is also reported. There is a brief résumé of the author's experimental work on the pathogenesis and the ocular manifestations of the pathology of the disease. In the opinion of the reviewer this section is not so valuable as the first part of the book. This may be because during the 3 years which have elapsed since the survey was completed, the author has published numerous papers in various journals, so that this part of the book contains nothing which he has not said already; but it is of course convenient to have all his material gathered together in one place.

One of his more important contributions is to have obtained a number of eyes for pathological examination. As one who has failed under similar circumstances to persuade the African to part with an eye, no matter how blind or painful it was, the reviewer would like to know how Rodger overcame this well-known reluctance of the African. Unfortunately, this information is not given.

The illustrations of both clinical conditions and of pathological specimens are all in black and white, with the exception of the coloured frontispiece. This means unfortunately that the impact of these preparations has been largely lost and some of them offer nothing to the reader. The publishers would have been well advised to insert fewer illustrations, making them in colour.

There is an interesting discussion on the posterior segment lesions alleged to be due to onchocerciasis, or associated with onchocerciasis, but there are no illustrations of any sort of the fundus conditions encountered by Rodger, which is a surprising omission in view of the amount of attention which he gives to this condition in this part of the book.

Once again, the author seems to have difficulty in clearly stating the conclusions to which he has come after studying this subject in such detail, and the reviewer must therefore refer the interested reader to this monograph.

The bibliography is given from time to time at the end of individual chapters, but this is not a very satisfactory arrangement for so large a monograph. Nor is the bibliography complete; for example, there is no reference to the very important symposium on onchocerciasis published in the *Transactions of the Royal Society of Tropical Medicine and Hygiene* [this *Bulletin*, 1958, v. 55, 925].

A fair summary of this monograph would be that anybody professionally interested in this subject should read it from cover to cover; the first part especially contains a great deal of interesting and valuable information, but by the time he has done so, the reader will not be very much the wiser, and will feel that there are just as many problems as before, remaining to be answered.

D. P. Choyce

INDIA, GOVERNMENT OF: MINISTRY OF HEALTH. **Medical Colleges and Training Institutions in India.** pp. ix + 244, 1959. New Delhi: Directorate General of Health Services.

Prospective medical students and other interested parties will find in this book a wealth of information which they would otherwise be obliged to seek

in the individual prospectuses of the separate institutions concerned. The volume opens with a list of medical, dental and nursing colleges, post-graduate and research institutions, shown by States. This is followed by a chronological list beginning with the foundation of the Calcutta Medical School in 1824 and proceeding to the Medical College in Kakinada, Andhra Pradesh, founded in 1958. There is then a list of upgraded departments, a summary of institutions at September 30, 1958, and a list of the number of graduates and licentiates each year from 1947 to 1958.

The bulk of the volume is taken up by details regarding each institution, in order of States. These notes vary in length according to the nature of the institution and some of them are very fully set out. In general, each begins with a short history, and then shows the courses of study available, number of seats, rules for application, fees, courses of study, degrees, scholarships, accommodation and other relevant information.

It is noted that there are in India 1 medical school, 50 medical colleges, 7 dental and 2 nursing colleges, 33 post-graduate institutions and 20 research institutions. The average number of graduates rose from 719 in 1947 to 2,219 in 1957 and the figures for licentiates were 42 and 59. Apart from the value of this book to those for whom it is intended, it brings out strikingly the considerable increase in the number of medical institutions in India. The Directorate General of Health Services in New Delhi is to be congratulated upon this admirable publication, which might with advantage be followed by similar publications in other countries. *H. J. O'D. Burke-Gaffney*

MARKELL, Edward K. [Ph.D., M.D.] & VOGE, Marietta [M.A., Ph.D.]. **Diagnostic Medical Parasitology.** pp. x + 276, 115 figs. (5 coloured). 1958. Philadelphia. London: W. B. Saunders Co. [49s.]

This short book on parasitology is written particularly for medical students of those universities where the subject receives a reasonable allocation of the curriculum, and is integrated with the teaching of infectious diseases in general. Although the title places the emphasis on diagnosis, the text includes adequate accounts of the parasites themselves and their life history, the pathogenicity to man and the clinical picture, and even the epidemiology of the infections. The authors have been able to make this wide approach by limiting the number of diagnostic methods described; the descriptions are brief and sometimes hardly adequate, *e.g.* in regard to skin biopsies in onchocerciasis or lymph gland puncture in African trypanosomiasis. Undoubtedly the book will appeal to students who wish to get a superficial knowledge of the subject and at the same time to learn the basic techniques.

Specific methods are described in two chapters, for the examination of faecal specimens and of the blood, while a later chapter is devoted to the more elaborate techniques employed in larger institutes, such as animal inoculation, culture methods, intradermal and serological tests etc. A final chapter describes the preparation and use of the commoner fixatives and stains, and the way to preserve specimens for examination in a central laboratory.

The intestinal protozoa and helminths are described in two chapters; the blood parasites in two chapters; the tissue parasites (*Toxoplasma*, *Pneumocystis*, and a number of helminths) and parasites of the genito-urinary tract (*Trichomonas vaginalis*, *Schistosoma haematobium* and *Dioctophyma renale*) in

two further chapters. The arthropod vectors are not considered, but mites, lice and myiasis are briefly described, and there is a table giving the important diseases transmitted by arthropods, their distribution and the vertebrate reservoirs. This table contains some inaccuracies and major omissions (*e.g.* tick-borne relapsing fever). A useful chapter deals with the commoner fallacies met with in routine examination of faeces and blood.

It is surprising that a book which gives several pages each to such rarities as *Entamoeba polecki* and *Pneumocystis carinii* fails to mention *Sarcocystis*. It is not very up to date in some respects, *e.g.* there is no mention of "mega" in Chagas's disease, or of the high lymphocytosis which is almost an invariable accompaniment of the acute stage of this disease, and the recent work on the epidemiology of the filarial worms receives scarcely any attention.

The illustrations are numerous and excellent, and include five colour plates.

P. C. C. Garnham

NOTICE

Consideration has from time to time been given to the question whether it would be desirable to include authors' addresses in the headings of abstracts in the *Bulletins* and it has been decided that the additional time and cost involved would not be justified. Subscribers are advised, however, that the Bureau will, on request, notify them of the name and address of the author of the article, or the publisher of the journal, from which an abstract has been made.

The Bureau also deals with enquiries from individual subscribers relating to abstracts which have appeared in the *Tropical Diseases Bulletin* and the *Bulletin of Hygiene*; correct references and the exact nature of the information required should be stated.

Printed in Great Britain by The Eastern Press, Ltd., London and Reading